THE ENGINEERING AND MINING JOURNAL.

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NOTE.—Communications relative to the editorial management should be addressed to Mr. ROTHWELL. The articles written by Mr. Raymond will be signed with a star.

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THE ENGINEERING AND MINING JOURNAL" ADVOCATES THE ADOPTION OF THE METRIC SYSTEM OF WEIGHTS AND MEASURES,

and urges all who are interested in the simplification of our present complicated and unsatisfactory systems to aid, by their active sympathy and encouragement, the early introduction of this much-needed reform.

MUSEUM COMMITTEE OF THE AMERICAN INSTITUTE OF MINING ENGINEERS.

MR. WM. G. NEILSON having resigned the secretaryship of the Museum Committee of the Institute, Mr. CHARLES A. YOUNG has been elected to fill the vacancy.

AMERICAN INSTITUTE OF MINING ENGINEERS.

OFFICIAL BULLETIN.

The next meeting of the American Institute of Mining Engineers will commence on Tuesday evening, February 27, at 8 o'clock, at the rooms of the American Society of Civil Engineers, No. 4 East Twenty-third street, New York City.

One or more sessions will be held on Wednesday at the Columbia College School of Mines.

Wednesday evening will be devoted to a *Conversazione* at the rooms of the Society of Civil Engineers, in which the members of that Society will take part. An informal discussion will be held on the subject of the advisability and practicability of adopting in this country the metric system of weights and measures.

Further announcements will be made hereafter. Communications relative to the programme of the meeting may be addressed to R. W. RAYMOND, 17 Burling Slip, New York, Chairman of the Local Committee.

THE MYSTERIES OF BOOK-KEEPING FOR STOCKHOLDERS.

Curious and wonderful are the possibilities of mine book-keeping, and the exquisite ingenuity with which the actual condition of a company can be stated so that no stockholder may get an idea of its real condition is perfectly marvelous. We all know what vain and delusive things are the promises of mining companies' prospectuses which always show by figures "which cannot lie" the enormous profits that must inevitably come to the fortunate stockholders. Alas! we all know also that these promises are rarely fulfilled—owing, of course, to "accidents" which no one could foresee. The annual reports of mining companies can also, unfortunately, be too often classed with this literature of fiction, and the same sanguine and unreliable predictions of profits in the near future are indulged in year after year.

In charity we may assume these glowing anticipations to be the honest convictions of over-sanguine natures, but what shall we say of annual reports that actually misrepresent the condition of companies, or that withhold the information necessary to enable stockholders to understand the manner in which their property has been managed and the actual value of their investments. Some of our companies indeed get over the difficulty in the simplest possible manner and make no report at all, leaving their stockholders completely ignorant of the whole matter. Others dispose of the question in a single line, by stating simply that the receipts for the year had been so much, and the expenditures so much (= the receipts). It is clearly impossible to analyze such a statement, but the management which makes a report of this kind, or which makes none at all, is wholly unworthy the confidence of the stockholders, and investment in the securities of such companies is of exactly the same character as an investment in *rouge et noir* or on the throw of the dice. We shall revert to these cases and give instances on another occasion. At present we wish to call attention to a class which, while making a show of giving intelligible statements of the business of the companies, in reality makes them in such form that the average stockholder rarely, if ever, ascertains the actual condition of his property. Let us take as an example of this class the New Central Coal Company of Maryland; and in doing so we think it but fair to state that though the company at first refused us a copy of its report, it subsequently furnished one, and the President, on ascertaining that we had made this review, urgently invited us to examine the books of the company, and to satisfy ourselves that its business is properly conducted. Our duty as public journalists is confined to an examination of its official published reports, the only statements which the public possess on which to judge of the value of the property. We have neither the right nor the desire to examine the company's books or private business, though we acknowledge the courtesy which offered us the facilities to do so. Our remarks are based upon the company's published statements, and our conclusions are the natural, and, indeed, inevitable, deductions from these figures. We do not assert that the actual condition of the company may not be very different from what our deductions indicate; but if so the reports should show it, and it is to this system of reports we object.

The New Central Company made no public report in either 1872 or 1873, but we have before us its reports for 1874, 1875 and 1876. From these we learn that the company was organized January 1st, 1872 with a capital stock (fully paid) of $5,000,000, and a cash capital on hand on that date of $182,222.21; mortgage debt on same date $272,222.21. It is a curious and suggestive coincidence in these figures that the mortgage should be exactly $90,000 in excess of the cash. The mortgage was paid in installments running through five years, and we are told that, including interest, there was paid out on it $330,024.30, or $57,802.09 in interest. This would indicate a rate of interest of about 10 per cent.

It is true the report for 1874 states that this mortgage on the 1st of January, 1872, was $299,347.22, instead of $272,222.21 as given in the later report of 1876, but we have no means of knowing why such a discrepancy should exist in the statement of a simple fact, nor of determining which is the correct amount. We take the latest.

It seems from this statement of the case that when the company was organized, its entire capital stock was issued in payment of its real estate, which has since stood (excepting in one instance to be noted presently) at that figure in the assets. The company started in 1872 with a net indebtedness of $90,000. Since then we are told it has earned net profits and produced coal as follows:

1872	$ 69,811.40	Coal produced		304,189	gross tons.
1873	154,603.09	"	"	285,135	" "
1874	176,221.14	"	"	243,186	" "
1875	95,971.65	"	"	258,851	" "
1876	80,292.20	"	"	240,233	" "
Total	$676,899.48	Total		1,331,594	" "

Since the company has never declared any dividend, it is natural to inquire What has become of this large amount of net profits?

We are told that $330,024.30 was used in paying off with interest the mortgage, and we are further told that $401,039.99 was used to purchase "cars," "additional real estate," "improvements," and to "cancel suspended accounts."

In the first year of its existence the company mined more coal than it has ever done since. In fact, its mines were fully opened at the date of its organization to a capacity of 1,500 tons a day, and since the capacity of the mines was presumably as great then as now, it is to be assumed the improvements, personal property, etc., were as valuable at that date as they are to-day. The improvements which subsequently appear as assets in these accounts, would, if this view be correct, appear to be merely such as became necessary to keep up the capacity of the mines, and should have been charged to current working expenses. This, indeed, seems to be acknowledged, for we are told that "all expenditures for improvements in 1875 and 1876" were thus charged.

The "additional real estate" is not specified, nor is its cost stated, but the principal if not the only items of importance under this head, were the Midlothian and Johnson mines, which, according to common rumor, cost the company in 1873 some $300,000, and which are now in a great measure "worked out" in the big vein. Why property almost exhausted should have cost the company such an enormous sum, or why the company should have paid this for what, as rumor has it, was bought only a few months before at about one-third this amount, are conundrums which cannot be solved from the information furnished the stockholders in these model reports.

The following is the statement of the company's accounts for the years 1874, 1875 and 1876, as presented to the stockholders:

ASSETS.	1874.	1875.	1876.
Real estate	$5,024,506 21	$5,000,000 00	$5,000,000 00
Mine improvements	80,000 00	30,000 00	30,000 00
Personal property	53,165 75	56,758 51	59,415 90
Barges	11,500 00	11,500 00	10,000 00
	$5,169,171 96	$5,098,258 51	$5,099 415 90
Cash on hand	13,914 21	43,463 56	49,413 31
Bills receivable on hand	9,764 57	1,568 75	6,983 17
Accounts receivable	135,491 75	117,627 71	132,107 87
Suspended accounts	.....	24,514 92	.....
Coal on hand	109,953 21	60,882 84	28,196 51
Total assets	$5,438,295 70	$5,346,316 29	$5,316,116 76
LIABILITIES.	1874.	1875.	1876.
Capital stock	$5,000,000 00	$5,000,000 00	$5,000,000 00
Bond and mortgage	135,185 20	74,074 09	.....
Bills payable	207,295 56	99,639 12	144,647 16
Unsettled accounts	5,462 75	62,303 45	43,412 20
Office and wharf rents	1,518 00	.....	.....
Surplus	88,834 19	110,299 63	128,057 40
Total liabilities	$5,438,295 70	$5,346,316 29	$5,316,116 76

Can any stockholder ascertain from these statements what has become of the $676,899.48 net profits reported as earned?

The final result of five years of this successful administration appears to be

about as follows, assuming, as is at least reasonable, that the improvements and personal property that were sufficient to produce 304,189 tons in 1872, were then (when prices were much higher than now) worth as much as those which produced 240,233 tons in 1876. We have this statement of the case:

ASSETS.	1872.	1876.	LIABILITIES.	1872.	1876.
Real estate..... Improvements.... Personal property	$5,000,000 00	$5,000,000 00	Capital stock.....	$5,000,000 00	$5,000,000 00
			Mortgage debt.....	272,222 21	.....
			Bills payable.....	.....	144,647 16
Cash on hand.....	182,222 21	49,413 31	Unsettled accounts.	....	43,412 20
Bills recivable	....	6,983 17			
Accounts receivable	.....	132,107 87	Total liabilities..	$5,272,222 21	$5,188,059 36
Coal on hand.....	.....	28,196 51			
Total assets	$5,182,222 21	$5,216,700 86			

Or from a net indebtedness of $90,000 in 1872, the company has come, after a partial exhaustion of its property by the mining of 1,331,594 tons of coal (or say 133 acres of the big vein), to a net excess of assets over liabilities of $28,641·50. If the coal mined were charged with say 10c. a ton, as a sinking fund, to pay for the property worked out (as is done generally by the large anthracite companies), the New Central Coal Company, as the result of its five years successful (?) work, would to-day have a net indebtedness of $104,518 instead of a balance of assets over liabilities of $28,641. But this statement is scarcely fair, for a portion of the coal was mined from leased land, or from land purchased since the organization of the company (and not now worked) and never charged up (as it should have been) among the assets. A large part of the coal, nevertheless, came from the real estate originally represented in the assets of the company, hence it would appear that instead of having made $676,899.48 net profits, the company has barely held its own, and is little or no better off now than it was on the day of its organization, when its liabilities exceeded its assets. It has paid running expenses, nothing more; or if profits have been made, they are not accounted for in the balance sheets furnished the stockholders.

There is, as we have shown, absolutely nothing in these reports made to its stockholders that justifies the statement that the company has made the profits claimed. Indeed, if we look at the report for 1876, and compare it with that of 1875, we find that the

Assets of the company were reduced by	$30,199·53
Its liabilities (exclusive of the mortgage) were increased.....	26,115·79
And the profits of year's business must have been, not $80,292.20, as asserted, but.....	17,757·77

—which items together amount to the $74,074.09 mortgage indebtedness paid off during the year.

Had the coal been charged, as it should have been, with a sinking-fund to cover the exhaustion of the property, the result of the year's business as shown by the report to the stockholders was a net loss of about $6 000. The *apparent* profit of $17,757.77 is, in the report of the directors, added to that mysterious mythical account called "surplus," which possibly some innocent stockholders may have imagined to be a kind of reserve or sinking fund of cash accumulated, but which in reality is a myth, being simply an arbitrary portion of the working capital, for it merely represents a portion of the money invested in "mine improvements," "personal property," "barges," "cash on hand," "bills receivable," and "coal on hand," a part of which items should apparently have been charged to current expenses, since they were, according to our view, merely "renewals."

We have entered more fully than we had at first intended into the analysis of these imaginative reports, because they illustrate in a striking manner a system of mine book-keeping which has ruined the credit of many a valuable property, and brought to grief countless mining investments. The New Central Coal Company is, unfortunately, by no means the only company, or even the only coal company, whose reports are open to severe criticism, and which call for reform in this particular, but it is a convenient, as well as flagrant, example of the abuse we denounce.

The stockholders of this company may be abundantly able to take care of themselves, and we do not feel called upon to advise them; but in the interest of honest, legitimate mining, we do most earnestly protest against a system of book-keeping and reporting which either leaves the stockholders in ignorance, or misleads them as to the actual condition of their property.

THE EQUIVALENTS OF ENGLISH QUOTATIONS OF SILVER.

TO THE EDITOR: SIR—It will be a gratification to several of your readers if you will state in the JOURNAL what the relation is between British pence and United States cents by which the value of silver per ounce can be translated from one to the other, and also whether the quotation given every week is in currency or gold. A. H. C.

Reply.—The following formula will give the value here (or parity) of silver on a London quotation of 57d. for example; that is—

Multiply the rate in London by 10, divide by 24, and multiply by rate of sterling exchange in New York (say 4·85 for sight):

$$\frac{57\times 10}{24}=256·5\times 4·85=124·40 \text{ per fine oz.}$$

From this gross price of 124·40 on these figures has to be deducted at least ¾c. per oz. for freight and insurance, and then an allowance for profit to the buyer—say ¼c. per oz. when the market is steady or rising, but of course more than this, say ½c., when the market is weak or falling.

Another point has to be taken into account, viz.: that the London figures telegraphed here and daily published is for "spot" or cash delivery, while the rate for silver "to arrive" within two or three weeks will be ⅛ to ¼d.=¼ to ½c. lower, especially in a weak market. The English standard is 925 fine, while ours is 900 fine.

This information, after all, is of very little practical value to any one out of the city, as the dealers here invariably offer as much as silver is worth, the competition being very sharp, and all the figuring in the world will never save a Western shipper ½c. per oz.

THE SILVER ISLET VEIN, LAKE SUPERIOR.

By Walter McDermott, Late Assayer, Silver Islet Mining Company.

(*Concluded from page* 55.)

The past experience at Silver Islet has been that the vein is only productive within the diorite dyke; that the limits of the productive portions of the vein within the dyke are determined by the region of plumbago impregnation, both in horizontal and vertical extension, and that the said productive portions of the vein are within what may be taken as the influence (if any) of the junction of an east and a west vein with the main lode. In the following extracts from Van Cotta's treatise on ore deposits it will be seen that all the conditions named above are generally accepted as favorable to the deposit of ore, so that any explorations based on the acceptance of these conditions has not only the weight of former experience as a justification, but is in accordance with such generalizations as men of science have so far deemed it proper to make. Of course it does not necessarily follow that even should the same conditions be again encountered, immense deposits of silver will be met with; but the chances are so greatly in favor of such a result that the search for similar conditions is the only rational method of exploration for the future.

Van Cotta, page 44—"The union of branches into a single lode, or the reverse, the splitting up of a lode into several branches, has been frequently assigned as the richness or poverty of the same. The fact is indisputable."

That the influence of the country rock is great, and the passing of a vein from one rock into another is attended with changes in the extent of ore deposition, and consequently that a junction of two different rocks is a favorable condition, we have the following remarks from Van Cotta:

Page 50—"Around Freiberg the lodes in general, without distinction in regard to the character of the formation, have attained a development favorable to mining only within compact rocks in which feldspar or quartz, hornblende, pyroxene, as also *carbon* (*graphite*, anthracite) or carbonate of lime, form an essential ingredient. Although to be sure the lodes are not always favorably developed in rocks conducive to a deposit of ore, and are frequently even barren of ores within them, still, when they do contain ores, it is only in these rocks; while on the other hand, they are always barren and never contain ores in the unfavorable rocks."

Page 48—"At Kaafjord, in Finland, the country rocks consist of diorite and arenaceous clay slate. In the first the lodes are very rich in copper, in the last they are contracted and unproductive."

Page 49—"In South Carolina the country generally is itacolumit, talc and mica schists, and gneiss, with dykes of greenstone, phonolith, etc. Where a lode comes in contact with a dyke, intersects it, or is broken by it, a local enrichment has always taken place. This enrichment is often so considerable that many lodes have only been productive in such places."

Page 466—"The copper deposits occur developed at the junction of the diorite and limestone, or diorite and garnet rock."

Page 418—"In Cornwall, by the passage of veins from one rock into another, a change usually takes place in the amount of ore in which the portion of lode at the junction is often the richest."

Page 46—"Near Freiberg the veins are enclosed in mica schist, which contains an irregular layer of *black graphilic* schist. The veins have only been found productive in the black schist. In the common mica schist they are poor."

Page 265—"We have a very fine example of a bed-like impregnation formed from a lode fissure, which principally follows but one rock, and that a *coaly* one, like that in which the quicksilver ores of Idria occur, and also similar to that of Braunsdorf near Freiberg, which exerts such a favorable influence on the lodes traversing it."

Page 507—"Quicksilver beds in bituminous shales of Idria and St. Anna in Austria, also at Vallalta near Agordo.

Page 400—"At Almaden Quicksilver Mine, Spain, the immediate wall rock is usually a *black carbonaceous* slate, and quartzite, with which hard and fine grained sandstones and slates alternate, but contain no ores."

In addition to the examples cited above as to the favorable effect of carbonaceous matter in the country rock, some instances from the neighborhood of Silver Islet itself may be here alluded to. At the Duncan Silver Mine native silver with zinc blende, galena and iron pyrites occur in a large calcspar vein. The country rocks are diorite and slate; parts of the latter are of a black carbonaceous character, and such parts have been observed to be favorable to the occurrence of silver. At the old Thunder Bay Mine the same fact was observed, and on a sudden change in the country rock the vein was lost, either by a throw or actual cessation of the vein. At the Jarvis Island Mine a strong calcspar and barytes lode crosses the slates and cuts a diorite dyke. In parts of the dyke the walls showed plumbago, and in such portions the vein usually yielded rich patches of ore. In the Pie Island vein strings of quartz in black carbonaceous slate are rich in native silver. At the Singleton Mine a bituminous substance is reported as existing in the wall-rock.

As a summary of the examples selected from Van Cotta, the following further extracts may be given, as the generalizations to be drawn:

Page 59—"There are certain rocks which can, locally at least, be termed ore carriers, while others are almost the reverse of this. The modifying influences of the country may be of themselves so slight that they escape observation; they may still, however, become perceptible through combination with other causes. For example, the effect of the junction of two lodes may of itself remain imperceptible, and even so the effect of a particular enclosing rock; but where they both meet—that is, where the line of junction of the former traverses the, also but slightly favorable, zone of rock—a very perceptible enrichment takes place."

Page 53—"We may consider it proved from all these examples that the nature of the country has exerted a certain influence on the contents of the lodes, and especially on the unequal amount of ore they contain; but the observations hitherto made can only be regarded as local, the results of which are not adapted to application, except in the localities where the observations were

made. Local observations must be made concerning this influence before it can be rightly adopted as a foundation for mining operations."

Enough has been said and quoted to prove, as clearly as such subjects admit of, that the conditions under which the silver occurs in the Silver Islet vein are not by any means abnormal; and that therefore mining operations may be safely based on past experiences; and that any other plan of exploration would be without either practical or theoretical justification.

There are several points of interest which may be given in a description of the Silver Islet vein, and a brief enumeration of a few is here added.

Although the vein is wholly under water, the mine is not what would be called very "wet." The water comes nearly wholly from below, streams of water in the upper levels ceasing suddenly when similar streams are cut at a lower point; the water may therefore be called legitimate mine water.

The fact has been observed both north and south of the diorite dyke, that a "throw" of the latter along the line of the vein has taken place, the diorite being found on one wall after the other has changed to slate. This "throw" was either contemporaneous with the formation of the vein fissure, or at least previous to the filling in of vein matter, as no evidence of such an extensive movement is to be seen in the vein itself; the only indications of motion afforded by "slickensides" would point rather to a vertical than horizontal movement. In the body of the vein "floors" of varying length are met with, and occupying a more or less horizontal position, but not in such regular form as to be set down to motion of the lode. These "floors" are merely lines of division, or cleavage planes, showing no difference in the vein matter above and below, and are always of a rusty color, due doubtless to clay and the passage of water; clay, as already stated, being found in many of the "vuggs." Along these "floors" thin leaves and small masses of sulphide of silver almost invariably occur.

There are two very interesting forms in which silver has occasionally been found. The first form is that of thin plates of nearly solid metal. These plates were from 1-16 to ¼ inch in thickness, and some were 8 and 10 inches square. When cut with a knife a solid surface is exhibited, and yet the plates are brittle. The cause of the brittleness becomes apparent under a glass, when it is seen that the plates are formed by the aggregation of numberless minute grains of silver, connected in a manner but yet distinct, and so closely deposited that the cut of a knife left to the eye an apparently homogeneous surface of metal. An assay of a portion of one of these plates showed it to be 980 fine silver. The second noticeable occurrence is the distribution of minute grains of metallic silver through a body of clear crystallized calcspar, giving the latter an opaque yellowish color, which on a grindstone speedily shows a bright metallic surface. Such ore is termed "clay ore" by the miners, owing to its color, and might be easily passed by as valueless by an inexperienced person. Some of the common forms in which the silver is found are extremely interesting, the native silver, in company often with niccolite, forming most beautiful arborescent figures through the body of the vein matter. In the neighborhood of "vuggs," masses of curiously twisted threads of native silver, superficially coated with black sulphide, were frequently brought to light. A few well defined but imperfect crystals of native silver have been observed.

At the surface of the vein, and partly exposed under water, a rounded granite boulder was found firmly imbedded in the vein matter; the nearest granite in place is nearly 20 miles north on the mainland.

As a somewhat similar occurrence to the plumbago in the diorite, may be given the finding of isolated and frequently large masses of a soft greenish chloritic substance. The principal mass of this dipped to the south across the dyke, and wherever it encountered the vein had a bad influence on the latter, breaking it up, pinching it, or simply impoverishing.

Work is now being pushed downwards in the diorite dyke; and the vein is found strong, perfectly defined, and of good character, not only at the present bottom, but at the lowest point yet reached by the diamond drill. When it is considered that only nine levels have yet been sunk, and that six out of those nine yielded remarkably in silver, it will be understood that the owners have good ground for expecting another prize, and for continuing work on the plan already so successful. And in this connection it is worthy of note that, the mine being well equipped and having all means at hand for working, including a fine stamp mill, will yield on all future discoveries an even greater profit than the operations have heretofore.

NOTES.

OSMIUM, according to recent experiments by Deville and Debray, has a specific gravity = 22·477, and is consequently the heaviest metal.

UTAH NOTES.—The Kearsarge Mine, in the Cottonwood Cañon, belonging to Lilly, Leisenring & Co., of Mauch Chunk, Pa., is turning out a "bonanza." Our latest advices state that the vein is 2 feet thick, and is yielding an ore which has assayed as high as $42,000 to the ton—in gold and silver.

AN UNALTERABLE METALLIC ALLOY has been obtained by M. Schmitte. A mixture of copper, platinum, and tungsten is fused together, granulated, by pouring into water containing ½ kil. of slaked lime and ½ kil. potassic carbonate per cubic meter, fusing again, and casting into ingots. It resembles gold 750 fine.

SIDERAPHTHITE, a new alloy, by Schmitte, is said to resist sulphuretted hydrogen; is not attacked by vegetable acids, and mineral acids have but a feeble action thereon. It consists of iron, sixty-five parts; nickel, twenty-three; tungsten, four; aluminum, five; copper, five. This new metal, or inoxidisable iron, can replace those metals or alloys which it is necessary to protect with silver-plating.

HYDRAULIC FORGING.—A novelty has been introduced in the royal carriage department of the Woolwich Arsenal in the shape of a hydraulic press for forging iron. The machine is capable of exerting a force of 3,000 tons, and it is believed the forgings produced by it will excel those manufactured by the steam hammers hitherto employed, which it will supersede.

NEW SAFETY LAMP.—M. J. Coquillon proposes to utilise the property possessed by palladium, of remaining red hot in a mixture of gas and air at the expense of the compound, in the construction of miners' safety-lamps. He is now making a lamp which should be perfectly safe, as the lamp cannot cause an explosion without the palladium giving timely warning.

MINING WAGES IN THE SCHUYLKILL REGION.—Pottsville, January 26, 1877.—The following parties, drawn to furnish prices of coal for fixing wages to be paid in January, 1877, make the following returns:

Ellangowan Colliery, $1.70; Plank Ridge Colliery, $1.80;
Keystone Colliery, $1.60; Forestville Colliery, $1.70;
Shenandoah City Colliery, no work.

The average of these prices is $1.70, and the rate of wages for January, 1877, is twenty-seven per cent. below $2.50 basis.—*Ashland Advocate,*

RAILROAD CONSTRUCTION IN 1876.

The statistics of Railroad Construction compiled by our excellent contemporary the *Railroad Gazette*, have for several years been the most reliable, in fact the only statistics published throughout the year. We make the following extracts from its annual review of the subject in the number for January 19:

Our detailed record of the new railroads constructed in the United States in 1876, published this week, shows that during the year 105 railroad companies laid track on 2,442 miles of railroad, increasing the total length in the United States to 76,640 miles, which, according to the best estimates of the population at this time, gives one mile of railroad for every 600 inhabitants. We have now kept a careful record of the exact mileage laid within each calendar year for five years. The first of these years, 1872, was the culmination of the great era of railroad construction. During the five years preceding, according to Poor's Manual, 23,700 miles had been constructed in this country; for the six years ending with 1872 the average construction had been 5,170 per year, and in eight years the mileage of the country had been doubled. The progress since this culminating period will be seen by the following:

	1872.	1873.	1874.	1875.	1876.
Miles constructed	7,340	3,883	2,025	1,561	2,142

The greatest inactivity was but a little more than two years after the time of the greatest activity; for the great dulness did not extend throughout the year 1875. As we said in our review for that year, a larger proportion than usual of the mileage built in 1875 was constructed in the latter half of the year. We had news of but 22 per cent. of it at the middle of the year, and the greater activity in the last half indicated some slight revival in railroad construction. This was confirmed by the experience of this year, when, as we see, 888 miles, or 57 per cent. more was constructed than in 1875. This year, however, the proportion completed in the last half of the year has not been extraordinary—about 70 per cent. of the whole.

In one particular the work of 1876 was much like that of 1875; to a very great extent it consisted of the construction of local lines of no great length. There was, however, a greater number of long lines built than in 1875, and the average mileage is greater than for two year previous, as shown below:

Year.	No. of companies.	Total constructed.	Average of each.
1872	210	7,340	35·0 miles.
1873	137	3,883	28·3 "
1874	105	2,025	19·3 "
1875	94	1,560	16·6 "
1876	105	2,443	23·3 "

Last year there were eight companies which constructed fifty miles or more each; in 1875 there were but six such companies. The eight companies with the largest mileage constructed but 498 miles of road in 1875; this year they constructed 898 miles. No company constructed as much as a hundred miles in 1875; five have done so in 1876, and one of them nearly 200 miles.

The summary below shows the mileage constructed during each of the past five years in each State and Territory, and the total mileage in each at the close of 1876. The basis of the total mileage is taken from Poor's Manual for the close of 1874, our records for 1875 and 1876 furnishing the additions:

Mileage of New Railroads Constructed in each State and Territory for Five Years.

	1872.	1873.	1874.	1875.	1876.	Total at end of 1876.
Alabama	134	2	18	0	0	1,7 2
Arkansas	156	247½	18	38½	49	767
California	195	85	140½	185	350¼	1,854
Colorado	105	121	23	111½	154½	960
Connecticut	25	29	0	21	7	925
Dakota	210	8½	0	0	0	290
Delaware	26½	21½	19	5	0	285
Florida	10½	0	18	0	0	484
Georgia	46	122	5	4	44	2,3 8
Illinois	686½	274½	231	200	49	6,980
Indiana	183	84½	2 9½	109½	72¼	4,072
Indian Territory	142	0	0	0	2	281
Iowa	452	93	48	84½	86¾	3,927
Kansas	445	36	61	0	76	3,226
Kentucky	143	65¾	31¾	0	138	1,464
Louisiana	3	0	0	0	0	539
Maine	62½	0	37½	10	20	987
Maryland	194	34	12	17	15	1,002
Massachusetts	37	117½	27¾	36	5	1,825
Michigan	571	196	48	30	46	3,437
Minnesota	357	48	36	0	34	2,024
Mississippi	22	7	27	0	10	1,028
Missouri	314	236½	31	27	109½	3,016
Nebraska	212	41	0	22	52	1,181
Nevada	18	18	40	64	0	714
New Hampshire	43	60	45	15½	9¼	942
New Jersey	103	40½	39	72¼	84	1,594
New York	435	242¼	125¼	206	69¾	5,520
North Carolina	60	15	66	13	43	1,371
Ohio	456½	172	142½	20	270	4,080
Oregon	82	0	0	0	0	251
Pennsylvania	251	203	191⅝	136½	50¼	5,896
Rhode Island	0	22	14	0	9	182
South Carolina	88	88	0	15	17	1,352
Tennessee	15	114	0	0	7½	1,638
Texas	391	385½	75	34½	387¾	2,072
Utah	57	85	59	27	0	486
Vermont	31	53	5	32	0	810
Virginia	49½	36	7 ¾	0	10	1,648
Washington	40	50	6	0	0	110
West Virginia	76	36¼	0	0	0	576
Wisconsin	459½	320½	102	23	123¾	2,575
Wyoming	0	0	0	0	0	459
Total	7,340	3,883	2,025	1,561	2,442	76,640

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"	XII	10, 12, 21, 24
1872	XIII	Full Volumes.
"	XIV	2, 3, 6, 10
873	XV	6, 10, 11, 22
1873	XVI	2, 11, 12, 18, 19, 20, 22, 23, 26
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"	XVIII	14, 15, 20
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AN OUTLINE OF ANTHRACITE COAL MINING IN SCHUYLKILL COUNTY, PA.*

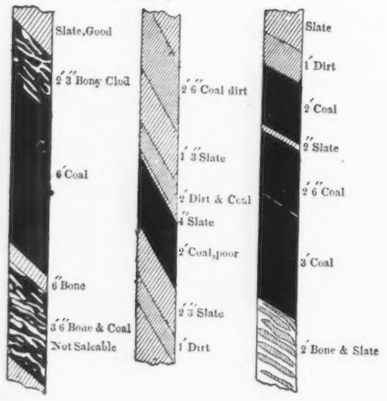
By J. Price Wetherill, Tremont, Pa.

(*Continued from Page* 58.)

From 6° to 12° of pitch, the breasts are worked with "buggies," which are small wagons running on a track, and pushed up to the face, loaded, and lowered to the gangway, as required. They do not generally hold quite a ton, and sometimes only half a ton. The rails may be of iron or wood, the latter being preferred in the steeper pitches, because there is greater friction between it and the wheels, and the loaded buggy is easier to handle.

The coal is dumped on a platform, from which it is loaded into the wagons in the gangway with shovels. Fig. 11 shows the arrangement. As much room is secured in the dump as the top will allow in order that the platform may hold as much coal as possible without additional handling, so that the miners may be enabled to continue their work should any accident cause delay to the gangway wagons, and consequently prevent the removal of the coal on the platform for a few hours. Buggy breasts are always driven with single shute, and the refuse thrown to one side out of the way of the road.

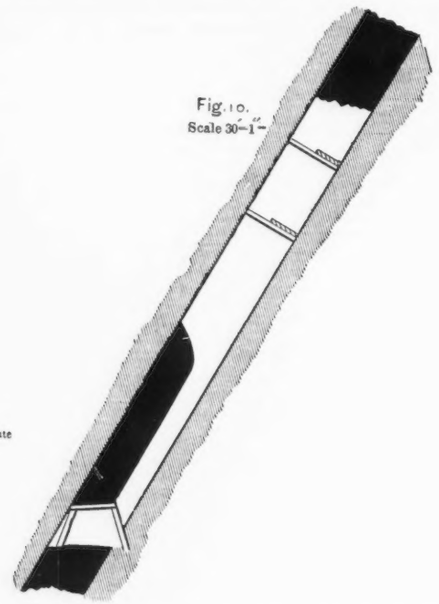
Fig. 9.
Scale 6–1″



When the pitch is flat to 6° the wagons are taken directly into the face and loaded there. Such breasts are called wagon breasts, and are turned with single shutes, not at right angles to the gangway, except where the pitch is flat. Fig. 12 shows the arrangement. As before stated, the gangway rises at a grade sufficient to secure drainage to the outlet, and each breast is also usually driven at such a grade as will permit the loaded wagon to descend by gravity, so that after it has been hauled empty to the face it is not necessary for the driver to return with a mule for it, thus saving time and labor. Furthermore, the nearer a breast can be driven directly up the pitch, the greater strength will be given to the pillars, and it is therefore desirable to drive the breast as near in that direction as will allow the mule to haul an empty wagon to the face. An advantage in overcoming these grades is obviously gained by turning the breasts towards the outlet, as shown in the figure, instead of away from it, which would appear to be the most natural direction for them to take.

Where the top is bad, the road is laid along one of the pillars to gain greater security, and the refuse or gob matter is thrown to one side out of the way of the road. Wagon breasts are frequently driven to much greater distances than any of the others, as the objections to doing so that were valid in their cases do not exist here, the timbers being hauled in in the wagons, and the coal hauled out.

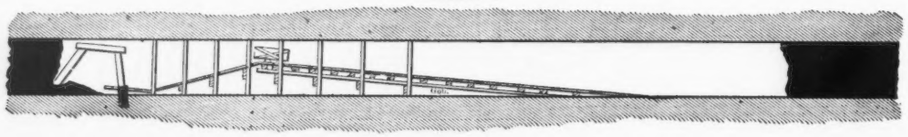
Fig. 10.
Scale 30–1″



Where the seam is of great thickness, slight pitch and a bad top, a large shute is sometimes driven on the bottom slate, up the center of the breast, to the distance at which it is desired to drive the breast, and timbered with 8 to 10-inch timber. Mining is then begun at the top of the shute, which is opened out at that point to the full width of the breast, and the coal is worked back to the stump heading, the good coal being sent down the shute to the gangway, and the top allowed to fall behind the face. Of course, on such pitches as would permit the impurities to crowd down into the shute, this plan cannot be pursued.

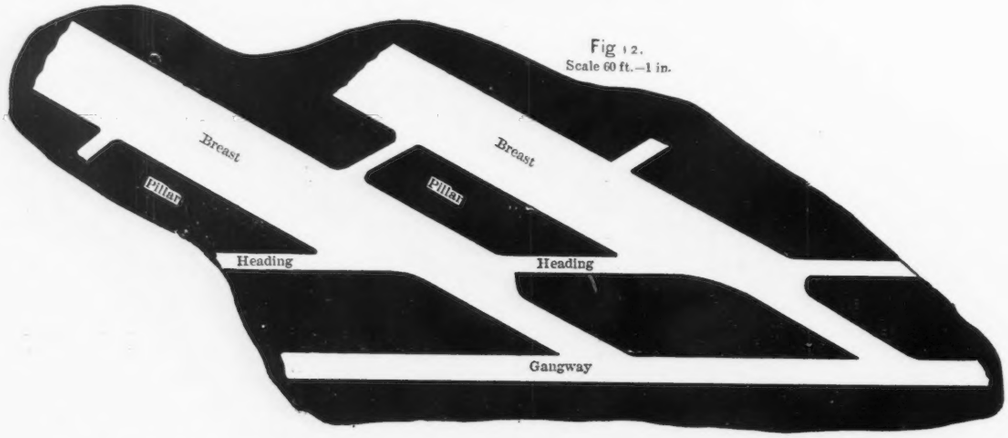
I have heard of breasts in their seams being worked in this manner, but as the expense of driving the shute is considerable, the amount of coal obtained in a thin seam in one breast would scarcely repay the outlay at present prices.

Fig. 11.
Scale 30–1″



Although many plans of working breasts are followed, I think those here shown will give the most common ones, as well as those most profitable, and the variations are not essential. I have purposely left out the method called "panel workings," as it is as yet but an experiment, and has not been adopted in practice with us.

Fig. 12.
Scale 60 ft.—1 in.



It is usually customary to open and work the breasts in the gangways as they are driven, so that shortly after the gangway has reached the point to which it is desired to drive it, the breasts are all finished. Whatever coal it may be possible to obtain from the pillars, is then taken out, beginning with the last breast and robbing out to the outlet. It frequently occurs that this

* A paper read before the American Institute of Mining Engineers, at the Philadelphia meeting, October, 1876.

system of working out the breasts as the gangways progress, so weakens the supports to the top as to bring on very serious crushes. Sometimes it is possible to meet this difficulty by setting new timbers in the gangways, but in some cases the gangways have been abandoned at serious loss. Benefiting by an experience so gained, there are collieries in which the gangways are first driven to the limit before any breasts are opened; then work is begun at the inside of the gangway, as many breasts being worked at a time as the capacity of the preparing apparatus requires; say, where two gangways only are driven, 10 to 15 breasts in each, and the pillars are robbed there, and all the coal obtained that is possible before opening breasts in another section.

As the gangways, shutes and headings, or "narrow work," as they are called, in general do not pay for the expense of driving, such an operation requires a large outlay of capital before any return is obtained, and is only within the reach of the wealthiest operators.

TO BE CONTINUED.

WATER GAS AND ITS ADVANTAGES.

By Geo. S. Dwight, New York.

Recent articles which have appeared in this and other scientific journals upon the advantages of a gaseous fuel, have been so extensively and favorably commented upon by the general press as to indicate a gratifying popular interest in that important subject—an interest which calls for a more comprehensive statement than has yet been submitted. Indeed it is a topic which may well attract all classes of minds, opening as it does numerous and subtle questions to the analyst, and touching the interest not only of every manufacturer and mechanic, but of the humblest housekeeper as well.

In fact it may be claimed that the utilization of heat is a fair gauge of the progress of civilization, and in this sense no single object in the great Exposition more strikingly symbolized the refinement of the present century than the great Corliss Engine whose iron sinews gave activity and use to ten thousand mechanisms. Unhappily it illustrated also the great defect of our present fuel system, by the immense waste of the heat-power from which it derived its motion.

Why this occurs and how it may be partially remedied, this article will attempt to explain. At the outset let it be distinctly stated that the writers who treat this subject as "*Gas vs. Coal*," do not put it quite fairly, because though a comparison lies between the two *forms* on economic and other considerations, the fuel is, in a sense, one and the same; that is to say, all the heat-energy contained in the gas is derived from the carbon of the coal, and hence there is no quarrel with the latter, but only with the present wasteful use of it. The black diamond will still maintain its value among the crown-jewels of civilization. For an intelligent understanding of this subject let us take up this question of loss, and ascertain as far as may be its extent and causes.

The loss is attributable to natural difficulties attendant upon the use of a crude material. As combustion is the union of combustible elements with oxygen with the development of heat, it is manifest that if these different elements exist in such form as to require any expenditure of heat to prepare them for such union, just that proportion of heat is rendered unavailable for other purposes, and is in that sense lost. For example, with all their strong affinity, O. and C., as they exist, the one in water or air and the other in coal or oil, cannot unite perfectly until some power has been exerted upon them sufficient to change their solid or fluid forms to gaseous ones; and this expenditure of power is just the measure of this particular loss in the combustion of coal in atmospheric air. The theory being that the dynamic force must be great enough to separate the atoms of the different elements operated upon, and so prepare them to coalesce with others with which they are in affinity, it is evident that the energy required to burn the diamond is immensely greater than that necessary to ignite charcoal, although these two substances are substantially carbon in different degrees of density. It is not surprising then, when the compact, mineral structure of coal is considered, that a large expenditure of heat is requisite to divide the molecules and enable them to reach a condition in which to form union with the oxygen of the air. It may be remarked also in passing, that as this converting process is exerted upon the surface of this solid material, thence extending gradually inward, encountering ash and other foreign substances, the operation is by no means uniform, and this contributes to an imperfect combustion and consequent waste.

But a still more important source of loss, and one apparently beyond remedy by any means in present use, is chargeable to the bad company which oxygen keeps. For every volume of this gas, the atmosphere contains four volumes of nitrogen, which, being a non-combustible gas, interferes with the union before described, and retards it.

Allusion is not made now to the divisory influence which nitrogen necessarily exerts in the final combustion in atmospheric air, by which it abstracts heat somewhat in proportion to its volume—a loss which, though considerable, is inevitable; but to the antagonistic action of that amount of nitrogen which in the stages preceding or incident to partial combustion, by mingling with the gases desiring to unite, so far dilutes a portion of them as to render them for the time being non-combustible, so that while in that condition they are swept out of the area of flame, and wasted.

An even more important loss is traceable to the fact that a portion of the products of combustion which float out from the fire chamber unburnt are not only combustible, but are *especially valuable* for combustion, and these frequently pass into the atmosphere a total waste of calorific ingredients, besides absorbing and diverting, like the nitrogen, an important amount of heat. A familiar illustration of this waste is seen in the flames rising from the tops of blast furnaces, composed largely of carbonic oxide, which, though one of the most combustible of gases, is yet unable to burn in the fire chamber where it was generated for lack of oxygen, and passes up to the chimney top, where, meeting this element in the air, it ignites. This particular wastage attaches in greater or less degree to almost all the methods in use, and it was this fact that led to the invention by that eminent metallurgist, Dr. C. W. Siemens, of the gas furnace which bears his name, and which ranks as the most economical and efficient system in use. It is, in brief, a producer, wherein coal is burnt with an air blast, the products of partial combustion being conducted thence into a furnace, and there burnt in lieu of the coal itself. In other words, the system barters the direct use of the coal for the partial gaseous products ordinarily wasted, and claims to make a decided gain by the exchange. Its defect lies in the fact that the gas so made contains the heavy proportion of nitrogen consequent upon the use of air, this amounting to two-thirds of the whole volume (beside the amount yet to be taken up in combustion), and reduces its calorific value in the manner already explained. If, then, his system is an economical one, what must be thought of the more extravagant ones in general use?

Another cause of loss in the burning of crude fuels, and one of sufficient importance to deserve mention, is the fact that there is mixed with the carbon a considerable quantity of foreign matter not combustible, which absorbs heat and gives no equivalent. This is represented principally by the ash and clinker, which every consumer of coal knows to be a large item. It reaches from 10 to 15 per cent. of the material paid for. To illustrate the difficulties attending the use of a crude form of fuel, let us take the most familiar methods, such as are employed in domestic cooking and heating.

Ignoring the mechanical imperfections of stoves and furnaces, lest an examination into them should extend this article unduly, we will examine the more evident sources of loss:

a. The expenditure of fuel in generating heat at times when it is not utilized. Every housekeeper must have been struck with the fact that a large amount of wood and coal is burned before the range is ready to cook, and that a probably larger amount still is used after the cooking is done. Annoying as this may be, it is cheaper to keep the fire up between meals, even in summer-time, when it is undesirable, than to let it go down and re-kindle three times.

b. The *excessive quantity* employed while in use. Often to accomplish some trifling result like the boiling of a tea-kettle, the whole area of fire space is necessarily kindled though not more than one-tenth of it is required. Twenty lb. of good anthracite coal contains heat-energy sufficient to raise 270,000 lb. of water one degree in temperature, or 1,776 lb. from 60° F. to the boiling point, 212° F., and yet it is to be feared this power is frequently employed in cooking a pot of coffee. If we have expended for our morning draught heat enough, if perfectly applied, to raise ¾ ton of the same liquid from atmospheric temperature to boiling point, it may be considered a somewhat luxurious beverage.

c. The items of labor and inconvenience incident to the use of coal are too apparent to need any enlargement.

These are the principal arguments against the general use of fuel in its natural condition, and they appear formidable enough to justify the assertion that not over ten per cent. of the heating power of such fuel is utilized.

Let it be remembered that it is in all cases *gas only* that we burn and from which we derive heat, so that the question is really whether each family can make a limited quantity of the gas as economically and successfully in very defective ranges and stoves, as the same or a much better article can be manufactured on a large scale at some great establishment whence it could be distributed to consumers. There can be no doubt that the advantage possessed by all concentrated industries exists in this one to at least as great a degree as in any other department of manufacture. We might as reasonably expect to grind our own flour, or weave our own fabrics economically, as to successfully compete with large gas-works properly constructed and skilfully managed.

The advantages connected with the use of a gas-fuel may be enumerated as follows:

a. The cost, labor and inconvenience of handling a heavy material is avoided, the fuel being capable of easy distribution.

b. It is in a form also free from those material impurities which involve a large residual waste, besides impairing combustion.

c. It is free also (if it be a purely combustible gas) from those ingredients which, in the present methods of heating, involve even larger loss than the cause last mentioned.

d. It is in precisely the condition to unite perfectly and instantaneously with the oxygen of the air, thus securing a thorough combustion.

e. Hence it gives an immediate and uniform result, and its flame temperature is constant.

f. The intense and steady heat of the flame just mentioned saves both time and money, by presenting an even fire surface ready at the moment of ignition.

g. It is a fire capable of concentration upon the precise point where the result is desired, and one that is thoroughly under control, the turning of a valve starting, graduating or stopping the combustion at will.

h. The general cleanliness of the system, no dirt or residuals being left.

i. The decided advantage from a sanitary standpoint of simply *burning* combustible gases in our dwellings, instead of attempting to *make* them as well, by means of the imperfect gas machines called stoves. In the one case the only risk arises from the possibility of a leak, readily detected by the senses, and having simple mechanical remedies; in the other it is a much more serious risk, because the defect is a chemical one, consequent upon imperfect combustion, and the infusion of poison into the atmosphere is likely to be frequent and insidious, to say nothing of the deoxidation of the air by contact with red-hot iron surfaces. The reduction of this particular danger is about in proportion of the greater completeness of the combustion of the more refined fuel.

These facts appear to be overwhelming arguments in favor of a gaseous, as against a gross form of fuel, and lead to the inquiry, what gases are available for such purposes?

The ordinary coal-gas made for illuminating purposes possesses some of the requisite qualities. It is a combustible gas of great purity, of sufficiently low density to render its distribution easy, and with a high flame temperature; but, *per contra*, the constituents which impart the illuminating power are expensive, while entirely unnecessary for fuel purposes. And yet, high-priced as it is, practical experience in its use proves that in some departments at least, it is certainly cheaper than coal, beside its collateral advantages; and it is at the present time employed, to a limited extent, by those who have become familiar with the facts. Exceedingly interesting tests have been made by the London engineers with city gas, developing some economic features in the matter quite surprising; and at the meeting of the American Gaslight Association in October last, a paper was presented by one of the members showing that careful experiments had so thoroughly demonstrated its saving, even at $3.60 per 1,000 cubic feet, that nine-tenths of his customers were using it in preference to wood or coal for kitchen and laundry purposes.

Nevertheless, coal-gas can hardly be expected to offer, for general use—domestic and industrial—a substitute cheap enough to supplant coal. Something at a still lower price is needed. Such gas as is made by the Siemens process before alluded to, has the advantage of cheapness, so far as the mere relation of cost and quantity is concerned, as it can be produced at about 15c. per 1,000 feet, but its composition is not favorable. It in fact contains less than 30 per cent. of combustible gases, the remainder being worse than useless, beside rendering it too heavy for ready distribution at long distances.

A water-gas, that is, a gas resulting from the decomposition of steam by con-

tact with burning carbon, if it can be made cheaply, possesses those very qualities most desirable in a fuel, viz., inflammability and intensity.

Composed of hydrogen and carbonic oxide, it is free from the undesirable element nitrogen; and what an advantage lies in that single fact, it is hoped the foregoing explanation may have made measurably apparent. If carbonic oxide representing the maximum flame intensity (among practical gases), and hydrogen with but little less of this quality, and an even "greater useful value," as Percy expresses it, do not furnish the very highest order of fuel, then science does not yet know where to seek it. Fortunately, too, it is a fuel obtainable at the lowest cost, though this is a recent achievement. For more than half a century, inventors of different nationalities have wracked their brains for some method by which water-gas could be produced in large quantities inexpensively for the industrial arts, but various defects have invariably attached to the systems proposed and rendered them unsuccessful.

At last, however, to reward the pertinacious effort, full success has been reached, and the Lowe process accomplishes efficiently and economically what has so long been sought.

It requires the outlay of great potential energy to release the hydrogen of water, but the Lowe apparatus, by a system at once original and simple, generates a concentrated and sustained heat which does the work with a facility that is astonishing, yielding a volume of 50,000 feet for a ton of coal burned.

The Lowe process, in the three stages of its operation, fairly illustrates in itself all the different methods employed in combustion, and these represent an ascending scale of excellence. The generator wherein the coal is burned, stands for the old-time principle of the stove or furnace, giving off its products of combustion. The super-heater, as the second chamber is called, into which these products are led and burned without other fuel, very perfectly represents the improvement accomplished by the more modern Siemens and Whitwell systems. The third operation shows the latest and highest method, to which the two others are preliminary and subordinate. After the coal has become thoroughly ignited, the atmospheric air is shut off and a new atmosphere of steam is introduced. This furnishes oxygen as the other did, but happily excludes the mischief-making and non-combustible nitrogen, and substitutes for it the most highly inflammable gas known, hydrogen—a most valuable exchange certainly in view of the fact that the result shows a product to the ton of coal possessing some four times the calorific value of that by the Siemens process.

Here then would appear to be a gas in which all the essentials unite for a fuel fully up to the demands of the present civilization: a fuel adapted to universal use, because the materials for its production are everywhere present, water and carbon being accessible to all localities,—the former in costless abundance, a constant element, the latter though in varying form, as coal, wood, peat, etc.

Sweden, famed for her superior iron, imports the coal with which to work it, while underneath her soil lie millions of tons of peat, capable of coking, and in that form generating water-gas.

Along our own Pacific Slope the miners are baffled by the refractory nature of many of the ores, yet the wood of the forests might be employed in the production of this fuel-gas, before whose intense heat the stubborn minerals would quickly yield their treasures.

There is no more doubt that water-gas is to inaugurate a new and wonderful development in the domestic and industrial arts, than that there is hydrogen in the sun. It is the "fuel of the future," and the not distant future. It stands ready to contribute new energy to civilization, and the age is prepared for it.

FRICTION OF PLAIN SLIDE VALVES.

By John W. Hill, M. E.

Several months ago the writer, in the routine of duty as a contributor to a Western mechanical journal, furnished for publication an article under the above head. The paper had for its purpose an exposition of the true relative power expended in moving the ordinary slide valve of steam-engines, with such hints upon the construction as would aid designers in reducing the loss of power by friction of the valve to a minimum. Since its original publication, the article has been reproduced in other papers, and variously commented upon. The vigor and pertinacity with which the writer's conclusions upon this topic have been disputed by certain parties in interest, induces the present paper, which, it is hoped, will place the matter in such a clear light as to remove all doubt upon the accuracy of the results deduced.

As an index to the present investigation, it should be understood that for several years past a class of semi-mechanics have been peddling about the country various kinds of balanced slide valves, some of which are ingenious in construction, whilst the majority fail to command even casual attention, and all are worthless when placed squarely upon their merits, as their purpose is to substitute for an insignificant evil a greater though less obvious one. Owners of steam-engines have been surfeited with circulars and testimonials commending the various traps; and after the benefits of the circular system have been completely exhausted, the inventor himself usually commences his pilgrimage. In due time he opens an assault upon some luckless owner of a steam-engine, by explaining in technical terms the many virtues of his improved valve, and the utter lack of these desirable qualities in all valves hitherto in use. There are few owners of engines who can successfully resist the seductive charms of the "new valve," and in due time the owner consents to have his otherwise good engine "improved" by the industrious semi-mechanical missionary.

The projectors of these improved valves are rarely modest men. Those, however, having a regard for the remote future, limit their claims of saving in cost of the power to be effected by the use of *their* valve at from 15 to 25 per centum, whilst others with a more elastic conscience usually estimate the benefits to be derived from "*their*" valves at from 25 to 50 per centum. Obviously, the only saving that a relieved valve can effect, as compared with an unrelieved valve, is the power expended in moving the latter. Conversely, there is not a single relieved valve in use, so far as the writer is aware, that has not, in a very short time after introduction, become so leaky as to render it a nuisance in the enormous quantity of steam passed into the exhaust, without performing its office in the cylinder, the steam thus wasted entirely obliterating any beneficial effect that might be obtained from a reduced load on the valve. Railway master mechanics who have investigated the relative merits of relieved and unrelieved valves, generally agree that the wear of links and joints of valve gears is least with relieved valves. Upon the other hand, they quite as unanimously agree that the relieved valves soon become excessively wasteful of steam, and that no increased economy of performance is perceptible in their use. Upon the whole, the experience of railway mechanics appears to decide the relieved valve as inferior to the plain slide valve (vide Rep. M. M. Convention 1874).

The purpose of this article, however, is not in disparagement of relieved valves, but rather to show that such valves are the result of an imperfect knowledge of the friction of the unrelieved valve in its simplest form. That this imperfect conception of the true relative power expended in moving the valve is not confined to obscure persons, is evidenced by an article in the *Scientific American* under date of September 30th, 1876, in which the editor says: "If we consider the valve of an ordinary 16-inch cylinder engine to measure 8·5 by 14 inches, and allow a pressure of 130 pounds per inch in the steam chest, there would be, supposing the valve to bed perfectly on its seat, a pressure of $8{\cdot}5\times14\times130=15{,}470$ pounds forcing the valve to its seat; and the whole pressure upon the piston being 26,442 pounds, the friction of the valve would entail a loss of $\frac{15{,}470}{26{,}442}=58$ per centum of the power of the engine."

The quotation contains two erroneous assumptions: first, that the friction is a measure of the area of the valve into the pressure per square inch independent of well-known co-efficients of frictional contact; and second, that the travel of valve is equal to the stroke of piston. Taking the data of the editor and allowing 20 per centum as the co-efficient of friction for cast iron on cast iron, and the travel of valve as ·2 of the stroke of piston, then the power absorbed by friction of the valve becomes $58\times{\cdot}20\times{\cdot}2=2{\cdot}32$ per centum of the power of the engine, instead of 58, as estimated by the editor.

The general treatment of the "power absorbed by friction of the ordinary slide valve," in the accepted text-books on the steam-engine, is vague and in nowise calculated to convey to the mind of the student the exact *status* of the problem. Rankine observes that "the slide valve is pressed to its seat, and the joint between it and its seat kept steam-tight by the excess of the pressure of the steam in the valve-chest, behind the valve, which comes from the boiler, above the pressure of steam in the interior of the valve, which communicates with the condenser or atmosphere. The amount of pressure of the valve against its seat due to the pressure from behind is the product of the intensity of that pressure into the area of the face of the valve." Again, he says that "in the cases of large valves the load of resistance is unnecessarily great."

It is an undeniable fact that as the area of valve increases, the actual power required to move it increases; and in the case of large engines provided with slide valves, the force required to move them may be so great as to make it desirable that they be relieved, so as to allow ready manipulation in reversing and shifting the link, or other variable expansion gear; but if this convenience of handling, and reduced expenditure of power in moving the valve is obtained with a sacrifice of economy in the performance of the engine, the question presents itself whether it is not preferable to use the slide-valve in its simpler form, with the corresponding economical performance, than to substitute relieved valves wherein the loss of steam between the valve-face and its seat, into the exhaust, more than compensates for the increased facility of manipulation.

The writer is unaware of any experiments being reported, except by parties in interest, upon the relative economy of the different systems of slide valve; but from such data as he has been able to collect, he is of the opinion that the highest grade of economy is to be obtained from engines with the plain valve.

Evidently the expenditure of power in moving the ordinary slide valve is the moment of friction into the travel, and the moment of friction is a function of the surface in contact and the unbalanced load on the steam side of valve (the total load being the area of the back of valve, parallel to the plane of motion, into the pressure in the chest). From this it appears incidentally that the smaller the valve for a given effect, the less the power absorbed in moving it. An erroneous idea prevails among engine builders that the friction of the valve is entirely independent of its size, and only dependent upon the area of steam passages which it covers. The fallacy of this conception will be evident in the following demonstration:

Let A represent the area of valve parallel to face impinged upon by the steam in the chest, and P the intensity of pressure in the chest. Assuming A as a constant for all positions of valve, then the total load upon the valve perpendicular to the plane of motion becomes $A\times P$; and were it not that a portion of this quantity is neutralized in its effect by a force also acting in a plane perpendicular to the motion of valve, and diametrically opposite to the force AP, then this latter, modified by a proper co-efficient, would represent the moment of friction at all points in the travel.

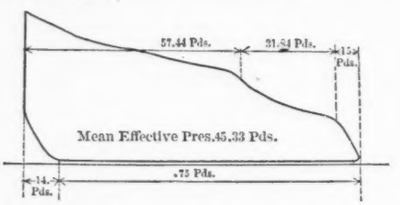
Let A′ represent the effective area of under side of valve referred to, complete stroke of piston, and P′ the corresponding mean pressure, then $A'\times P'$ is the neutralizing force; hence the moment of friction, F, is a function of AP—A′P′. Let B represent the travel of valve in feet; then the expenditure of power in overcoming the resistance of friction in the valve is expressed by the equation—

$$H=\frac{F\times B\times 2r}{33{,}000} \qquad (1)$$

Let H′ represent the indicated horse-power of engine, then the per centum of power, K, thus expended, becomes—

$$K=\frac{H}{H'}100 \qquad (2)$$

To exemplify the foregoing principles the writer assumes an engine of 16-inch cylinder, 400 feet speed of piston; slide-valve 8¾ by 14 inches; travel 5 inches; steam ports 15 square inches area; exhaust port 24 square inches area; pressure in the chest 85 pounds; steam cut-off at two-thirds piston stroke. The diagram is from an engine of these dimensions, and has been carefully estimated for this demonstration:



The area of valve parallel to the plane of motion is $8{\cdot}75\times14=122{\cdot}5$ square inches, pressure in the chest 85 pounds, and the total load $122{\cdot}5\times85=10412$ pounds; the counter-pressure acting upon the opposite side of the valve is made up of the mean pressure from admission to cut-off, acting upon an area

equal to the area of steam port, for half travel of the valve in opening and closing port, hence

$$\frac{15\times57\cdot44\times1\cdot25}{5}=215\cdot4 \text{ pounds.}$$

The mean pressure from cut-off to release, acting upon an area equal to the area of steam port, for whole travel of valve during expansion,

$$\frac{15\times31\cdot84\times1\cdot25}{5}=119\cdot4 \text{ pounds.}$$

The mean pressure from release to end of stroke, acting upon an area equal to the area of steam port, for half travel of valve during release,

$$\frac{15\times15\times\cdot625}{5}=28\cdot125 \text{ pounds.}$$

The mean counter-pressure from commencement of return stroke to exhaust closure acting upon an area equal to the area of exhaust pocket in valve, area of exhaust, pocket $12\times3\cdot75=45$ square inches, hence $45\times\cdot75\times\cdot9=30\cdot375$ pounds.

The mean cushion pressure from exhaust closure to opening of steam port at commencement of new stroke, acting upon, and equal to, the area of steam port for whole travel during compression,

$$\frac{15\times14\times1\cdot25}{5}=52\cdot5 \text{ pounds.}$$

In addition to this is the value of the mean pressure from release to end of stroke, acting upon the area of exhaust pocket, and the counter-pressure during the latter part of return stroke, acting upon an area equal to the area of steam port for half travel of valve during exhaust closure, lacking the data necessary to estimate their values, these elements are omitted. Taking these several quantities together, the neutralizing force becomes 445·8 pounds, then 10412—445·8=9966·2 pounds.

Assuming the co-efficient of friction in this case to have been ·15, then $9966\cdot2\times\cdot15=1494\cdot93$ the moment of friction, the double travel of valve ·83 feet, and the revolutions per minute 100, then

$$\frac{1494\cdot93\times\cdot83\times100}{33{,}000}=3\cdot76 \text{ H. P.}$$

The mean effective pressure by the diagram is 45·33 pounds; area of piston, 201; piston speed, 400; and the indicated power of engine becomes

$$\frac{201\times45\cdot33\times400}{33{,}000}=110\cdot5 \text{ H. P.}$$

and the per centum of power expended in moving the valve $\frac{3\cdot76}{110\cdot5}\times100=3\cdot4$.

The opinion entertained by certain engineers that the slide valve floats on a thin film of steam between it and its seat, is not only untenable, but undesirable, for if the fit of the valve to its seat is such as to allow a circulation of steam of maximum pressure sufficient to balance the load (in part) upon the opposite side of the valve, it is likewise sufficient to permit the passage of steam between these surfaces into the exhaust. Again, considering the close relation that must necessarily subsist between the valve and the seat in order to *prevent* leakage into the exhaust, it is probable that the liquefaction of steam, due to the attraction of the metal surfaces, is sufficient to prevent the entrance of steam under the valve.

HAMILTON, O.

NOTES.

THE PHILADELPHIA COAL AND IRON COMPANY has adopted a regular system of promotions, the same as exists in the railroad company. Outside bosses are made inside bosses, and inside bosses are made superintendents.

IMPORTS OF SALT.—We annually import a large quantity of factory salt from Liverpool, as will be seen by the following table, showing the exports to the United States from that port in the years named:

	1876. Tons.	1875. Tons.	1874. Tons.	1873. Tons.		1876. Tons.	1875. Tons.	1874. Tons.	1873. Tons.
New York	66,359	48,915	41,194	46,470	Savannah	4,911	8,642	6,544	10,434
Philadelphia	32,232	27,074	32,462	30,304	New Orleans and Mobile	34,997	51,501	28,225	53,908
Baltimore	24,698	25,941	24,945	27,112	Other ports	21,471	29,407	22,917	26,939
Boston	11,843	9,002	7,742	9,855					
Charleston	4,206	4,872	2,980	6,078					
Galveston	14,383	7,178	9,867	11,512	Total	215,100	212,532	176,585	222,612

—*North-American*, Jan. 30, 1877.

PENNSYLVANIA LAW OF MINE TRESPASS.—Section 1: Be it enacted, etc., that if any person or corporation shall mine or dig out any coal, iron or other minerals, knowing the same to be upon the lands of another person or corporation, without the consent of the owner, the person or corporation so offending shall be guilty of a misdemeanor, and, being thereof convicted, shall be sentenced to pay such fine not exceeding one thousand dollars, or to such imprisonment not exceeding one year, as the court in their discretion may think proper to impose; and the person or corporation so offending shall be further liable to pay to such owner double the value of said coal, iron or minerals so mined, dug out, or removed,—or in case of conversion of the same to the use of such offender or offenders treble the value thereof,—to be recovered, with costs of suit, by action of trespass or trover as the case may be, and no prosecution by indictment under this act shall be a bar to such action. Provided: That the provisions of this act shall not apply to persons picking coal for their own domestic use.

LARGE PRODUCT OF THE NORTH CHICAGO ROLLING MILL COMPANY'S BESSEMER PLANT.—The North Chicago Bessemer Works, under the admirable management of Mr. Robert Forsyth, has attained a well-deserved pre-eminence, and has demonstrated the enormous capacity of this process, and of the plant now in use. The following record will be of interest:

Blast put on cupola, Monday, January 22d, 4 A. M.
First heat turned up, Monday, 5:50 A. M.

Monday,	63	heats, yielding	329	430-2240	tons ingots.
Tuesday,	65	" "	341	1330-2240	" "
Wednesday,	68	" "	355	980-2240	" "
Thursday,	73	" "	383	800-2240	" "
Friday,	75	" "	392	1010-2240	" "
Saturday,	21	" "	107	1720 2240	" "
Total heats.	365	Tonnage	1,909	1820-2240	

Dropped cupola bottom, Saturday, 11:55 A. M.
Last heat blown, " 12:25 P. M.
Night turn, Friday, January 26th: 1st heat turned up 5:41 P M., 39th heat turned down 5:11 A. M. Tonnage, 204 870-2240. Product for 10 turns ending 5:30 A. M. Saturday, 1,802 100-2240 tons.

ON THE VOLUMETRIC DETERMINATION OF SULPHUR AND AMMONIA IN ILLUMINATING GAS, WITH A DESCRIPTION OF THE APPARATUS EMPLOYED.*

By H. E. Sadler and B. Silliman, of New Haven, Conn.

(*Continued from Page* 60.)

VOLUMETRIC ESTIMATION OF THE SULPHUR.

Having so far demonstrated the efficacy of the new apparatus, the Letheby test was discarded, and the determinations of the sulphur hereafter given were made by precipitating the sulphur in the drip from the new apparatus by barium chloride, in the manner already described. The apparatus was not changed, except to introduce the tube *d*, to arrest the ammonia which, previously passing through the flame in undetermined quantities, had vitiated the volumetric estimations of the sulphur acids by standard alkali solution. The alkali used was caustic soda. For the scrubber, standard sulphuric acid was chosen on account of its slight volatility, and in order that the absorption of acid vapors by the gas, then deemed possible, might not complicate the results by introducing a new acid into the products. To saturate the alkali in the drip, standard hydrochloric acid was chosen, as it permitted a gravimetric estimation of the sulphur in the portion taken after it was titrated, avoiding alternate sources of error, either the estimation of the total sulphur introduced with the sulphuric acid, or obtaining two separate portions of the drip, having in solution exactly equal quantities of acid and of sulphur. Moreover, though free hydrochloric acid is somewhat volatile in boiling solution, experiment demonstrated that, with the degree of dilution and heat employed in these determinations, the loss was unappreciable. A 100-c.cm. pipette, and a burette measuring 100 c.cms. by tenths, were used for supersaturating the alkali with acid, and a 25 c.cm. burette graduated to tenths for titrating back with the soda. For each determination a portion of the drip resulting from the combustion of from 6 to 10 feet of gas was taken, divided into two measurably equal portions, and duplicate experiments carried through, as shown in the following table, the results being calculated to grains in the hundred feet:

No. I.	Date. II.	Acid caught per 100 ft., expres'd in grns., Sulp'r III.		Grains of Sulphur caught, per 100 feet. IV.		Excess. Acid. V.	Excess. Sulphur. VI.	Excess of acid correct'd. VII.	Soda, c.cms. per foot of gas burned. VIII.	Rate, feet burned in 100 min. IX.
1	Aug. 22–3	(38·55) (38·65)	38·60	39·34	39·34	.....	0·74	—0·74	7·90	1·054
2	23	(46·91) (46·58)	46·74	(41·33) (41·42)	41·37	5·37†	.....	(—0·10)	9·75	1·026
3	23–4	(35·99) (35·93)	35·96	(35·28) (34·76)	35·02	0·94	.....	+0·94	12·28	1·023
4	24	(30·55) (31·25)	30·9c	(33·95) (32·46)	33·20	.....	2·30	—1·21	13·67	1·056
5	24–5	(35·28) (36·01)	35·64	(34·48) (32·60)	33·54	2·10	.....	+0·60	10.65	1·041
6	25	(36·61) (35·95)	36·28	(34·55) (34·23)	34·39	1·89	.....	+1·89	12·80	1·026
7	28	(34·20) (34·20)	34·20	(35·59) (35·37)	35·43	.....	1·23	—1·23	9·44	1·035
8	29	(38·98) (38·98)	38·98	(39·53) (39·62)	39·58	.....	0·60	—0·60	11·70	·996
9	30	(36·01) (35·68)	35·84	(35·80) (35·22)	35·51	0·33	.....	+0·33	13·33	·984
10	30–1	(33·27) (32·91)	33·09	(32·25) (31·96)	32·11	0·98	.....	+0·98	9·90	10·22
11	Sept. 31–1	(33·63) (33·79)	33·71	(34·38) (33·86)	34·12	.....	0·41	—0·41	10·87	·987
12	1–2	(35·84) (35·54)	35·69	(33·91) (33·74)	38·82	1·87	.....	+1·87	9·95	·988
13	2–3	(34·87) (35·00)	34·93	(33·06) (33·06)	33·06	1·87	.....	+1·87	10·99	·966
14	3–4	(31·92) (32·58)	32·25	(31·40) (31·44)	31·42	0·83	.....	+0·83	10·79	·944
15	4–5	(31·90) (32·07)	31·98	(30·09) (30·30)	30·20	1·78	.....	+1·78	10·20	·957
16	5–6	(26·03) (26·51)	26·27	(26·46) (26·91)	26·68	.....	0·41	—0·41	9·65	·949
17	6–7	(24·81) (24·81)	24·81	(24·36) (24·33)	24·35	0·46	.....	+0·46	10·47	·943
18	7–8	(22·36) (22·36)	22·36	(20·12) (20·27)	20·20	2·16	.....	+2·16	13·19	·897
19	8–9	(18·43) (18·44)	18·43	(18·92) (18 93)	18·92	.....	0·49	—0·49	10·75	·960
Average errors						1·29	0·75	.....	.....	.....
Average total error						0·27	....	.....	.....	.....

It will be seen by comparing columns III. and IV. that the acid caught indicates the quantity of sulphur in the gas with tolerable accuracy, sufficient for all manufacturing purposes. Columns V. and VI. give the excess of acid and sulphur in terms of grains of sulphur to the hundred feet. The average error in favor of the acid is 1·29 grains, and in favor of the sulphur, 0·75 grains, making the average total error 0·27 grains in favor of the acid. Assuming this as a constant quantity which, being deducted from the acidity found, gives the sulphur, we have as a limit of error in favor of the sulphur (No. 4) 2·03 grains, in favor of the acid (No. 18) 1·89 grains. We may say, then, that one grain to the hundred feet is the average error, and two grains the limit of error for the volumetric determination of the sulphur in gas by this apparatus.

THE FORMATION OF NITROUS ACID AND OTHER SOURCES OF ERROR.

In endeavoring further to reduce or eliminate this variation, the drip from the condensation tube was carefully tested for other acids and bases. Besides the soda and sulphuric acid, nitrous acid, probably mixed with nitric, was detected by silver nitrate, and also on setting free the nitrogen acids with sulphuric by the coloration tests, ferrous sulphate, brucia, etc. No other acids could be found—carbonic, of course, excepted. The absence of sulphurous acid or a soluble sulphite was a surprise. It was demonstrated by precipitating duplicate samples, oxidizing but one of them. The resulting precipitates did

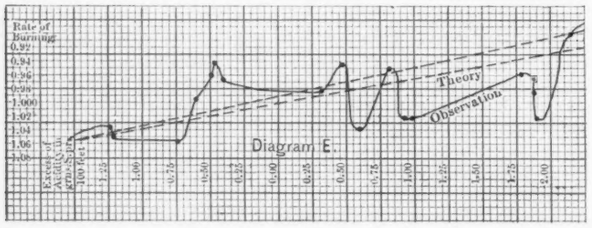
*A paper read before the American Institute of Mining Engineers at the Philadelphia meeting, October, 1876.

†An error of 2 c.cms., in determining the quantity of alkali used, would have made this result —0·10. An exactly similar error in experiment No. 15 was discovered in time to be corrected. At all events, this result is so abnormal that it seems proper to disregard it. It will be noticed that, throughout, the duplicate experiments accord fairly with each other. In two instances, however, they differ by more than 1 grain per 100 feet, viz., in experiments Nos. 4 & 5. It is probable, since they cannot both be nearly right, that one is entirely wrong, and therefore, in computing Column VII, only that result is taken which is most in accord with the other experiments.

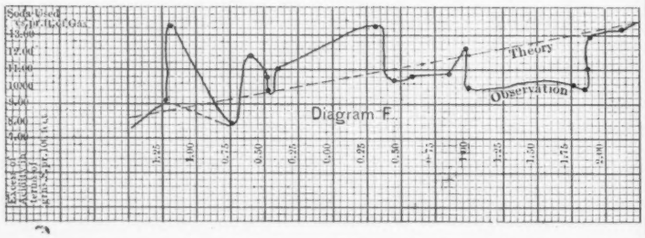
not differ sensibly in weight. This fact was further confirmed by adding 10 c.cms. of a carefully titrated solution of potassium sulphite to successive equal portions of the drip. On titrating back with standard iodine solution and starch paste, it was found that 5·65 c.cms. of the sulphite in each solution had been oxidized. Of the bases a trace of ammonia alone was found. The drip in experiment No. 12 was submitted to Nessler's test, and showed 9-10 grain of ammonia per 100 feet, equal to 84-100 grain of sulphur. The nitrogen acids were not determined, as no means for the estimation of so small quantities presented itself, except the somewhat difficult combustion process. It seemed impossible* that more than 1-100 grain of ammonia could be supplied by the 700 feet of air admitted by the apparatus for the combustion of 100 feet of gas, and it followed that the remainder must be produced in the burning. There was no other source for the nitrogen acid.

We are brought here face to face with a curious phenomenon. Nitrogen, forming simultaneously under the same conditions, an acid and a basic radical with the oxygen and hydrogen directly or indirectly supplied by the air and gas respectively.

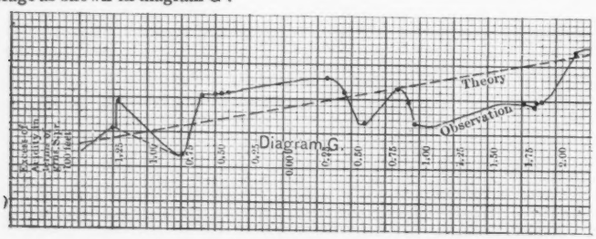
This fact has been before noted and more clearly proved.† Two theories present themselves in this connection to account for the variations noted in the above table between the sulphur and the total free acids produced by the combustion. The first is that where the gas is passing rapidly and the flame is near the smoking point, the nitrogen will find an abundance of hydrogen from the gas and a scanty supply of oxygen. The tendency will then be to form ammonia in excess of nitrous acid. When, on the contrary, the gas is burned slowly and the supply of air being the same, a surfeit of oxygen awaits the scanty hydrogen, acid will be more freely formed than ammonia. The excess of total acidity will then be a function of the relative supply of gas and air, and column VII. will follow column IX., which gives the rate. How far our experiments sustain this view will be seen from diagram E :



The second theory plants itself upon the hypothesis of the dual nature of nitrogen gas, one atom of each molecule broken up in nitrification taking to itself hydrogen and the other oxygen. In this case an excess of acid or base from the nitrogen is impossible, the product of nitrification being uniformly ammonium nitrate, a salt. This substance, however, is very unstable, falling readily back to water and nitrogen, and yielding easily to an acid, ammonia, to a base, nitrous acid. Thus, this body, in passing through the condensing tube, would surrender its acid to the soda in amount somewhat proportionate to the quantity of free soda in the tube, while the ammonia, but slightly absorbed by the alkaline solution, would pass off at the escape. Column VII. would then accord in some sort with column VIII., which gives the relative proportion of soda and gas used in each experiment. Diagram F shows the variations :



To pronounce upon the accuracy or sufficiency of either proposition without further experiments made with especial reference to them would be premature. Probably outside of certain limits which we may call the normal working, both the rate and the alkali used have their influence on the result, as will appear more clearly by comparing the two curves given above with the curve of their average as shown in diagram G :



For the rest the perturbations must be charged to the inaccuracy of the tes as worked, of which there are several sources which, small in themselves, may yet be considerable in the aggregate. First, we assume that, at the end of an experiment, the condensing tube contains the same quantities of alkali and of sulphur as at the beginning. The difference, when compared with the total quantity, must be small, but a difference there may be. Second, the alkali pipette attached to the apparatus, the acid pipette and burette, and the alkali burette must be strictly accurate ; at least they should accord with themselves and each other. The former of these conditions was not in our apparatus entirely fulfilled. Third, the opportunity for error is considerable in judging the change of color with cochineal, especially when the determinations are made on different days and cannot be compared with each other ; and, lastly, the "personal error" cannot be entirely disregarded.

TO BE CONTINUED.

* See Johnson's "How Crops Feed," p. 55, and especially Viele's determinations, Pelouze and Fremy I, 320.

† Shaeffer Am. Jour. Sci., Nov. 1863. T. Sterry Hunt, Chemical and Geological Essays. Appendix p. 446. Shönbein, London and Edinburgh. Philos. Mag. June, 1862, p. 466.

ROOT'S PATENT SPIRAL PIPE.

Lightness and strength are the chief requisites of pipes for use in hydraulic mining and irrigation, the enormous expense of transportation usually more than balancing any economy in first cost. So desirable has lightness appeared, that sheet-iron pipes, made in short lengths with riveted joints, as in stove pipes, have been used in some places, but the practical difficulties of making the joints tight has been an almost insuperable objection.

The advantages of sheet-iron pipe without its disadvantages have been secured to a very great extent in the spiral pipe manufactured by the Abendroth & Root Manufacturing Company of New York (whose card will be found in our advertising columns). This pipe is well adapted to all the purposes for which other iron pipe is used, and its strength and durability are testified to by those who have used it. The heavy pressure pipe is tested with hydraulic pressure to 150 lb. per square inch. The light description is suitable for smoke or ventilating pipe, and will be found both cheap and convenient. Those who need piping and study economy—and who does not in these times?—will doubtless communicate with the manufacturers, who can give more information than our limited space will allow us to impart.

THE COAL MINES OF CENTRAL UTAH.

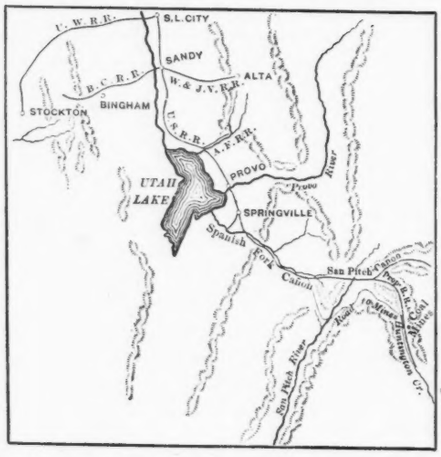
By J. H. Morton, Salt Lake City.

Among the varied mineral and other resources of the mountain region of the Western States and Territories, there is none so completely overlooked, nor yet any of more vital importance, than the coal fields that for ages to come must supply the fuel of the great communities that are certain to fill the plains and valleys of the western and central portion of the Rocky Mountain region.

Barely mentioned by the report of the United States Geological Surveying parties, a few points are set down upon the maps as the outcrop of beds of coal or lignite. These, and a few mines opened along the line of the Union Pacific Railroad, and one or two in each of the States of California and Oregon, are all that is known of the coal mines of the Pacific slope.

Seeing the important place that a plentiful and available supply of coal occupies in the commercial world, and more especially where metallurgical pursuits form the chief industry of the people, with the limited attention that has been given to our mines of coal, is it any wonder the development of this country labors under a serious disadvantage, seeing that the fuel necessary for the reduction of the silver and other ores that form the mainstay of our prosperity, comes at present from a distant State, and is brought to us over two thousand miles of costly railroad transportation ?

During the present year there has been imported for use in this Territory about twelve million pounds of coke from Connellsville, Pa., and about sixteen million pounds of charcoal from California and Wyoming, at a cost of about 30 dollars per ton for the coke and about 20 cents per bushel for the charcoal. This quantity of fuel has been used in addition to the charcoal produced in the Territory in reducing the ores of four mining districts contiguous to Salt Lake City, and does not include the quantity of domestic charcoal used in the southern districts. What the quantity required would be if the other districts throughout the Territory were equally as well developed as the four above referred to can hardly be estimated, but their development is hardly possible until a permanent supply of fuel can be obtained.



Taking Salt Lake City as the central point, there is within a radius of six hundred miles, upon every side, an almost continuous field of metallic wealth, in which gold, silver, copper, lead, zinc, iron and nearly every valuable mineral product of the world abounds, in a profusion found in no other country. Coursing through this region are rivers and streams almost innumerable. Their valleys make up in the qualities of their soils for the limited area they present; their climates vary from the perpetual winter of the northern mountains to the eternal summer of the valleys of Arizona.

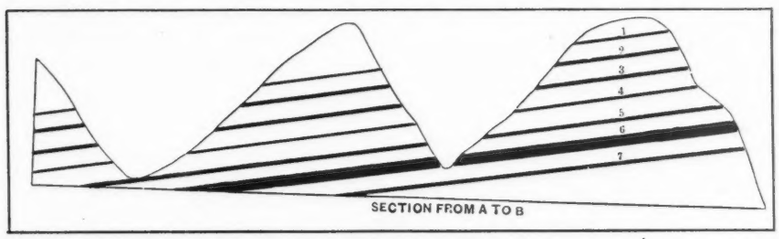
What this region is capable of producing under careful husbandry, let the success of the Mormon settlement, through a great portion of its extent, attest. Apart from its agri-

cultural products, this sparsely settled, almost unexplored country, produced in 1875 over $60,000,000 in gold and silver. Utah alone produced in 1875 upwards of ten million pounds of lead and silver ores shipped out of the country, eighty-two thousand pounds of refined lead, six hundred thousand pounds of copper ore, and six hundred thousand pounds of copper bullion, besides twenty mi lions pounds of lead and silver bullion, unrefined; and this year, and years to come, will show a constant increase of her metallic product.

But it is not of the production of metals that I wish to write, though I wish to show the importance of a cheap and constant supply of fuel adapted to the wants of the country.

About the first of this month I visited the coal mines situated on Huntington Creek, in San Pete County, about one hundred miles southeast of this city. These mines were discovered in the summer of 1874 by some Mormon settlers, and are now the property of the Utah Coal Mining & Coke Company of Salt Lake City.

The mines number seven in all, or rather that is the number actually opened,



SECTION FROM A TO B

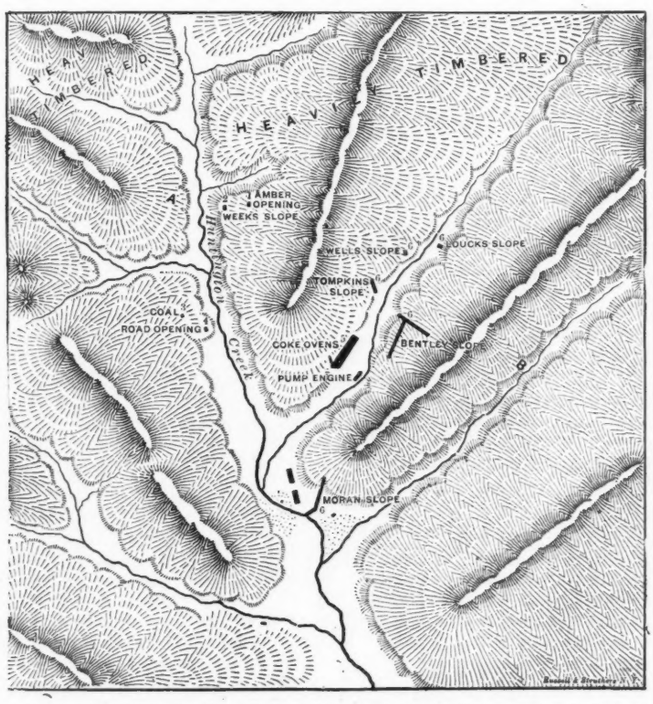
and that I examined. The position of the beds and the manner of their outcropping, together with the nature of the country, will be seen by reference to the figure marked "section from A to B." The surface is covered by a heavy forest of pine and other timber. The formation in which the coal occurs is sandstone, probably of the cretaceous period; the valleys are covered by the erosion of the rocks by streams, and there is no evidence of faulting of the strata. The elevation of the mines is about seven thousand feet above sea-level, and of the summits of the hills from seven hundred to two thousand feet higher. A fair wagon road extends from the town of Springville, on the Utah Southern Railroad, to the mines, and a route for a narrow-gauge railroad has been surveyed and found practicable. The coal mines are opened by drifts run from the faces of the hills, the principal openings being the Bentley, Tompkins, and Moran slopes, upon the largest of the veins. These aggregate over two thousand feet of tunnels in all. The vein shows a fine body of coal fully fourteen feet in thickness, without any admixture of slate, except in the Bentley slope, where there is one thin seam of from one to six inches in thickness. This vein produces all the coal the company use at present. The analysis of the coal is as follows:

Coke.....48·00 | Volatile.....46·50 | Ash.....5·50 | Total. 100

I think the coal in the other veins will not differ materially from this analysis. This vein is now opened, so that if the state of the market and transportation could be had as required, there could easily be produced five hundred tons of good coal per day. The thickness of the coal in all the veins I found to be as follows:

No. 1 on section, clear coal,	2	feet	6	inches.	No. 6 on section, clear coal,	14	feet.	
" 2	"	"	5	feet.	" 7	"	"	2 "
" 3	"	"	1	foot 6 inches.				
" 4	"	"	4	feet.	Total.....	31	"	
" 5	"	"	2	"				

The coal in Nos. 1 & 2 and 6 contains considerable resin, which, though in-



creasing the quantity of volatile matter, does not appear to interfere with the coking. This resinous coal makes a very excellent grate coal, burning bright and free, and leaving no clinker or any considerable ash. It makes a very fair gas coal, and should supersede the Australian shale now used in this city. The coke, though inferior in hardness to the Connellsville coke, is capable of sustaining the weight of any charge of ore in a blast furnace, and is eagerly sought for by the smelting men of Salt Lake. The company are now producing about 12½ tons coke daily, using ten ovens. The coal costs, delivered at the ovens, about 70c. per ton, the men working by the day at $3.50 for ten hours' work: the cost of producing 12½ tons of coke being the cost of working twenty men, including superintendent, fireman, carpenter, blacksmith, two teamsters, clerk, two men at the ovens, and miners or laborers about the mines. As coke is the only product sent to market, the whole daily expense of the company must be borne by the 12½ tons of coke daily produced. This makes the cost of the coke appear high, but it is evident that a great part of the expense of running the ten ovens would not be increased if the company could run one hundred. With a full complement of ovens, and contract work in the mine, the company could turn out a good article of coke for about two dollars per ton. They can at any time erect as many ovens as the market for coke will justify them to use, as they have a large supply of fire-brick on hand and a fine bed of fire-clay, with plant to supply all the brick that can ever be required.

The only difficulty that is now to be overcome is to construct a railroad from Springville, on the Utah Southern Railroad, to the mines. I passed over the route proposed on my return from the mines, and found no place that could not be easily passed over by a railroad, the grade in San Pitch Cañon being only about seventy-five feet to the mile. Indeed, it will be necessary to build this road to reach the timber of this country, as the timber in Salt Lake Valley is nearly exhausted, and the demand for mining timber every year increasing.

The following estimates by the engineer employed by the company give the cost of building the road to the mines:

Estimated cost of construction and equipment of railroad from Springville, Utah Southern Railroad, to Huntington Creek Mines, distance 55 miles.

47 tons 30 lb. iron T rail delivered at Springville, $75	$3,525 00
5,000 " ⅝×5½ spikes, 7c	350 00
1,500 " Fish bars, 5c	75 00
400 " Bolts and nuts, 9c	36 00
3,000 6-feet ties, 35c	1,050 00
Grading	1,000 00
Track laying and track work	500 00
Telegraph	250 00
Stations, water-tanks, $200, and engineering, $200	400 00
Total per mile	$7,186 00
Estimated cost, 55 miles	$395,230 00
4 locomotives, $8,000	32,000 00
1 passenger car, $2,500, 1 baggage, $1,500	4,000 00
150 coal cars at $400	60,000 00
Add 20 per cent. for contingencies	98,246 00
Total	$589,476 00

This is about the cost of coke and charcoal for one year to the smelting works of the Territory. The coal fields are in all probability of considerable extent, as I was informed that in Pleasant Valley, six miles further east, the same beds were found, and similar coal is said to have been found in Castle Valley to the south. Whether these other outcroppings will prove to be of the same character or not, there is enough coal in the beds on Huntington Creek to supply the wants of this Territory for ages to come. In Iron and Washington counties, in the southern part of the Territory, there are also extensive beds of coal useful for all domestic and steam purposes.

November 28, 1876.

THE following analyses of the coal and coke from the property above referred to have been recently made by Mr. J. Blodget Britton of Philadelphia. This coal cokes exceedingly well, and produces an article which, selling at $25 per ton, is taking the place of Connellsville coke, which now costs $28 a ton at the smelting works of the Territory:

	Coal.	Coke.
Volatile matter	49·61	2·70
Fixed carbon	48·21	94·05
Ash	1·88	3·25

The coal contained sulphur ·547; phosphorus, a trace; the coke contained, sulphur ·356; and phosphorus, a trace.

These facts are of the utmost importance in more respects than may appear at first sight. Utah possesses magnificent deposits of iron ore, and there can be no doubt that a coke of the quality indicated will soon find use in iron smelting. With the completion of this road we may look for very rapid progress in the development of the coal production of Utah, and to the establishment there of iron-works at no distant day.—[Ed. *E. & M. J.*

BRITISH COLUMBIA EXPORTS.—We have been furnished with statistics of the exportation of products of the province by the customs authorities. It would seem that the exports of the natural products of British Columbia for the last half of 1876 amounted to $1,514,888. For the corresponding period of 1875 the exports were $1,606,083—the falling off being principally attributable to a diminution of $193,583 in the value of the gold crop, and a decreased shipment of furs and hides, which shows a falling off of $36,775. In every other natural product there is a steady and grat fying increase. Notwithstanding the coal-glut at San Francisco, we sent away 15,000 tons more in the last half of 1876 than in the last half of 1875. In fish and fish oil there is an increased export of $33,359 over that of 1875, and in lumber there is an increase of $35,493 in favor of 1876. The official figures are as follows:

FOR SIX MONTHS ENDING DEC. 31, 1875.		FOR SIX MONTHS ENDING DEC. 31, 1876.	
Gold	$1,072,703	Gold	$879,120
Coal, 35,917 tons	193,470	Coal, 50,920 tons	201,556
Fish, fish oil, etc	53,309	Fish, fish oil, etc	86,668
Lumber	129,904	Lumber	165,397
Furs and hides	154,339	Furs and hides	117,504
Manufactures	50	Agricultural products	2,235
Agricultural products	2,308	Manufactures	1,500
	$1,606,083	Cranberries	848
			$1,514,888

The total exports for the first half of 1875 were $1,167,584, and for the first half of 1876, $1,102,999. The exports for the two years will therefore stand thus:

1875.....$2,773,667 | 1876.....$2,617,887 | Falling off in 1876.....$155,780

—*British Colonist.*

MINING NOTES.

THE COMSTOCK MINES.

We take the following from the *Gold Hill News*, showing the condition of some of the principal mines of the Comstock Lode up to the 24th ult.:

California.—Daily yield 500 tons of ore, keeping all the mills steadily running. By prompt and active exertions the side tracks of the railroad have been cleared of snow and the ore supply of the mills kept up, so that there is no apparent chance for any delay whatever in the crushing operations of the mine. The ore breasts on the 1,400, 1,500 and 1,600 feet levels never looked more prosperous than at this time. In fact the entire mine is looking far better than it did at the date of the payment of its first dividend. The south drift on the 1,600-feet level is making steady progress, the face still in good ore. The main southeast drift from the deep winze on the 1,650-feet level is being pushed forward at as rapid a rate as the great heat will admit of, the full size of the drift still in rich ore. Sinking the C. and C. shaft is making slow progress, the flow of the water at the bottom being fearfully strong. A large supply of timbers and other supplies have been provided for winter use, so that there is not the least danger of any delay in any of the operations of the mine being caused by the storms or snows of winter.

Consolidated Virginia.—Daily yield 285 tons of ore. The ore breasts going southward and eastward on the 1,400-feet level are showing a steady improvement. The other ore-producing sections of the mine show little if any change. The enlargement of the drift connecting with the Gould and Curry Mine on the 1,550-feet level is going steadily forward and is doing much toward affording the needed ventilation in that part of the mine. The west drift from the C. and C. shaft, on the 1,650 feet level, cut through the east wall and entered the ore vein during the first part of the week. According to measurements and calculations, made in accordance with the dip of the vein on the 1,550-feet level, the ore was reached by a distance of eighty feet sooner than was expected. The dip of the vein at the point where it was struck is about forty-six degrees. The east wall is regular and perfect in its formation. The ore where it was first encountered gave assays ranging from $30 to $236 per ton. This drift is now in twenty-three feet, with every indication that the ore will prove richer with each foot that the drift is advanced. The appearances of the ore in this drift, when taken in connection with the solid and rich character of that found in the south-east drift from the deep winze in the California Mine, gives an almost positive assurance that the 1,650-feet level will prove the equal, if not superior, to any level yet opened in the mine. No prospecting of the ledge has yet been a tempted through the north drift on the 1,700-feet level, the heat being so great that such an attempt would be almost useless.

Belcher.—Daily yield, 130 tons of ore. The ore stopes show but little, if any, change. Sinking the main incline is considerably impeded by the flow of water. Opening the 1,800-feet station in the combination drain shaft is being pushed with great vigor. As soon as this station is completed a drift can be started south through the Belcher ground to connect with the main incline, while another can be started north to connect with the Crowd Point incline.

Bubion.—The south drift on the 1,500-feet level is showing some fine quartz. The east drift on the 1,620 feet level is to all appearances just about ready to cut the ore vein at that point. The north drift on the 1,700 feet is making good progress, but shows no valuable change since last report. The north drift on the 2,000-feet level is showing a steady improvement as the face advances northward.

Imperial Consolidated.—Work is progressing finely at all points. The north and south drifts from the bottom of the north winze on the 2,135-feet level are each making good progress. So also is the north drift from the bottom of the south winze. The east crosscut on the 2,000-feet level is making good headway without any change of value to note.

Savage.—No effort is being made toward lowering the water below the 1,900-feet level. Everything is being done that is possible to complete the air communication with the Hale & Norcross, and as soon as that is done, draining the water below the 1,900-feet level will be resumed.

Chollar-Potosi.—Sinking the main incline is making the usual fair rate of progress the bottom still in very favorable working ground. Sinking the Combination shaft is also making splendid progress. Daily yield of ore, 100 tons, the assay value of which is $29 per ton.

Silver Hill.—The main incline has reached a point 100 feet perpendicularly below the 650-feet station, at which a new station is being opened preparatory to opening a new level. The flow of water in the shaft is still strong. The east drift on the 860-feet level is steadily advancing toward the ore vein. On the 444-feet level the lateral drift is being continued from the turn-table directly east of the shaft, in a southerly direction, passing through the center of the ore vein as it advances. Further to the northward on the 444-feet level a drift has been started to the northwest to connect with the Justice openings. This drift will strike the Justice on the 800-feet level.

Sierra Nevada.—The north drifts on both the 1,500 and 1,700-feet levels are steadily advancing, the face of each showing fair quartz, but no ore that will yet pay for milling. The prospects for ore in that portion of the mine are evidently growing better every day. The main south drifts on the 1,700, 1,500, 1,250 and 1,000 feet levels are all steadily advancing, the ground in the face of the 1,500, 1,250 and 1,000 feet drifts being much softer than it has been at any time since work was commenced on those levels. There is no change to note of the main east prospecting drift on the 1,500-feet level.

Overman.—The prospecting drifts on both the 1,300 and 1,400-feet levels are steadily advancing, with indications of the most favorable description. The flow of water is now easily handled by the new pumping machinery, which is working with the greatest perfection possible. The south drift, on the 1,200-feet level, completed the connection with the Caledonia north drift yesterday, affording a long sought and much needed ventilation of the mine to that depth. A winze has been started below the 1,200-feet level, the bottom of which is in good ore. It is now down twenty feet.

Hale & Norcross.—Everything at this mine is centered for the present in completing the reparation of the connecting drift with the Savage on the 1,900-feet level. The north drift on that level has been cleaned out and repaired to the north line, and is now being continued in the Savage ground. As soon as that is finished the little cave in the main incline, below the 1,900-feet station, will be cleaned out and draining the water resumed.

Justice.—Daily yield, 340 tons of ore, keeping the mills all steadily running. The ore breasts on the 500, 600, and 700 feet levels show no material change in either the quality or yield of ore. The north-east drift on the 1,000-feet level is steadily advancing, the face in a mixture of quartz, clay and porphyry. Nothing has been done during the week in the face of the main south-east drift on the 1,000-feet level on account of the strong flow of water encountered.

Best and Belcher.—In cross-cut No. 1, on the 1,700-feet level, the diamond drills have penetrated a distance of 305 feet, which, if we add the length of the drift—30 feet—would make a total of 335 feet prospected to the eastward. At this point the drills stuck, and their use had to be discontinued. A number of low assays were obtained from the drillings, but nothing that would seem to exhibit a prospect of a paying body of ore. The best of experts, however, coincide in the opinion that the drills have never yet penetrated far enough to the eastward to reach the rich ore vein now being opened upon in the Consolidated Virginia mine. The drills will now be placed in crosscut No. 2, where the distance to the ledge is not supposed to be near as great as in crosscut No. 1. The enlargement of the connecting drifts with the Gould & Curry mine, and the recent cold spell of weather is greatly benefiting the ventilation and helping forward the work of development on the lower levels.

Sutro Tunnel.—Face of header continues in hard ledge porphyry, with occasional ks of quartz and clay. Total length of tunnel 15,687 feet.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Jan. 27.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.*	Week.	Year.*
Wyoming Region.				
D. and H. Canal Co.	37,446	127,570	45,005	118,547
D. L. and W. RR. Co.	33,489	133,322	38,173	150,883
Penn. Coal Co	15,622	57,633	27,196	93,320
L. V. RR. Co	15,429	67,617	25,382	90,986
P. and N. Y. RR. Co.	1,267	2,418	826	2,978
C. RR. of N. J.	143	74,478	29,558	84,958
	103,396	463,018	166,140	541,678
Lehigh Region.				
L. V. RR. Co	43,404	138,691	39,734	139,831
C. RR. of N. J.	18,476	43,805	36,903	111,586
D. H. and W. B. RR.	—	—	844	1,774
	61,880	182,556	77,481	253,191
Schuylkill Region.				
P. and R. R. RR. Co.	74,282	263,280	76,415	143,974
Shamokin & Lykens Va.	5,256	29,482	4,168	14,012
	79,538	292,762	80,583	158,586
Sullivan Region.				
Sul. and Erie RR. Co.	401	1,134	1,333	4,282
Total	245,215	939,470	325,537	957,737
Increase	—	—	—	—
Decrease	80,322	18,267	—	—

* Year beginning January 1st.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent. of the whole production.

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Piedmont Railroads amounts to 23,382 tons, as compared with the corresponding period in 1876.

Belvidere Delaware RR. report.	Week.	Year 1877.	Year 1876.
Receipts of coal at Coal Port (Trenton)	—	—	3,051
" " " South Amboy	3,359	19,723	68,715
Shipments at Coal Port (Trenton)	—	—	—
" South Amboy	10,820	31,311	25,377

Receipts of Coal at Boston, for the week ending Jan. 26, and years from Jan. 1, 1876 and 1877.

From	Week. Tons.	1877. Tons.	1876. Tons.
Alexandria and Georgetown	—	—	2,150
Philadelphia	1,500	9,020	10,700
Baltimore	—	2,442	5,262
Other places	1,570	4,838	11,692
Great Britain	—	610	525
Nova Scotia	—	—	199
Total	3,070	17,808	30,528

Perth Amboy business:

	Tons.
Received for the week	20,369
Shipped for the week	12,862
On hand Jan. 27	132,909

The Production of Bituminous Coal for the week ending Jan. 27 was as follows:

Tons of 2,000 lb., except where otherwise designated.

Cumberland Region, Md.	Week, Tons.	Year, Tons.
Tons of 2,240 lb.	9 793	39,185
Barclay Region, Pa.		
Barclay RR., tons of 2240 lb.	8,295	29,004
Broad Top Region, Pa.		
Huntingdon and Broad Top RR.	3,195	10,008
*East Broad Top	105	65,999
Clearfield Region, Pa.		
*Snow Shoe	483	51,389
*Tyrone and Clearfield	6,162	1,192,418
Allegheny Region, Pa.		
*Pennsylvania RR.	1,064	210,315
Pittsburgh Region, Pa.		
*West Penn. RR.	2,068	203,354
*Southwest Penn. RR	398	57,169
*Penn. & Westmoreland gas coal, Pa. RR.	5,549	896,810
*Pennsylvania RR.	1,905	309,846

* For two days ending Dec. 30.

The Production of Coke for two days ending Dec. 30.

Tons of 2000 lb.	Week.	Year.
West Penn. RR.	1,751	57,798
Southwest Penn. RR.	4,245	539,630
Penn. & Westmoreland Region, Penn. RR.	632	60,465
Pittsburgh, Penn. RR.	1,432	162,132
Total	8,060	820,025

COAL TRADE REVIEW.

NEW YORK, FRIDAY EVENING, Feb. 2, 1877.

Anthracite.

The cloud which we have pointed to for several weeks as hanging over the coal trade is no larger, but is becoming more visible to the ordinary observer.

On Wednesday, at a meeting of the principal stockholders of the New Jersey Central Railroad Company, the President announced that unless aid be given the company by the stockholders, a receiver would have to be appointed. If this demand should be met by the stockholders, the company might be able to tide over its present difficulties. Whether any remedy has been suggested for the fundamental cause of the troubles of this and other companies, we have not learned. But this homeopathic theory of *similia similibus curantur*, though it may be excellent in the case of the maladies that afflict human organs, is certainly not successful in the treatment of debt-dropsy in railroad corporations.

Although this company is the first that has been compelled to acknowledge its excessive weakness, there are others that will probably be driven to the same action. The financial necessities of the companies are the great disturbing elements in the coal trade; they cause coal to be sold in large quantities at less than the actual cost of placing it in market, and it makes combination an impossibility were it even advisable. From the number of season contracts that have already been consummated and the efforts that are being made to secure others, it is very evident that some of the companies are preparing to do a large business even though it must be on a very small margin, if any at all.

The present circular prices for coal are so low that they should satisfy the greatest "bear," yet we are reliably informed that even these prices are being shaded, and in some cases to a considerable extent.

The demand for coal is even smaller than it was during the past month, although freights are easier. The very mild weather which we have had for more than a week has very much reduced the demand at retail, and correspondingly reduced the demand at wholesale for domestic sizes. Although some buyers have been making season contracts, yet the greater number are holding off in anticipation of even lower prices.

The production of anthracite coal last week was 245,215 tons as against 325,537 tons for the corresponding week of 1876, showing in comparison a falling off last week of 80,322 tons. This decrease comes notably from Wyoming Region and the Lehigh shipments of the New Jersey Central Railroad. The total production since January 1 has been 939,470 tons as against 957,737 tons for the like period of 1876, showing a falling off this year of 18,267 tons.

Bituminous.

We note a sale of 5000 tons of Clearfield coal to be shipped to the West Indies. The movement of both Clearfield and Cumberland coals is almost entirely on old contracts, with occasional sales of cargo lots.

In addition to the low prices of anthracite coal which the bituminous producers will probably have to contend with, we find that 1,000 tons of Newcastle coal has been sold for shipment from England at $3.62½ gold, per ton, delivered into carts in this city, free of all expenses. Although but 1,000 tons of this coal have been sold, yet the sellers were desirous of disposing of a

much larger quantity at the same figure. This price, it is true, is based upon abnormally low rates of freight, but it looks as though freights from England, under the greatly reduced import business we are doing, or are likely to do in the future, would be but nominal for some time to come, in which event English coals may become serious competitors with our domestic coals. The sale in this instance was for gas purposes, and will perhaps attract more particularly the attention of producers of gas coal. In quality it resembles more nearly our steam than our gas coals, which are much richer both in yield and illuminating power, than the coal contracted for in this particular case.

The Pennsylvania Railroad has decided to continue its existing rates of freight until April 1, excepting the "ice blockade" rate, which will be discontinued on the 14th inst.

New York.

Wholesale Prices of Anthracite Coal f.o.b. at the Tide Water Shipping Ports per ton of 2240 lb.

	Lump.	Steamer.	Grate.	Egg.	Stove.	Chestnut.
Wyoming Coals.						
‡Lackawanna and Scranton at Hoboken and Weehawken	2 75	2 75	2 75	2 90	3 60	3 25
Wilkesbarre at Port Johnston	2 85	2 85	2 85	3 00	3 65	3 25
Plymouth, R. A.	...	...	2 85	3 00	3 75	3 35
Susque. Coal Co. at Amboy W.A.	2 85	2 85	2 85	3 00	3 65	3 25
Kingston at Hoboken	2 75	2 75	2 75	2 90	3 60	3 10
Pittston at Weehawken:						
A. S. Swords	2 90	2 90	2 90	3 00	3 55	3 30
Penn. Coal Co.	3 00	3 00	3 00	3 10	3 60	3 35
Lehigh Coals.						
Old Company at Port Johnston	3 75	....	3 25	3 25	3 75	3 25
Old Company's Room Run "	3 75	....	3 25	3 25	3 75	3 25
Sugar Loaf, Hobok. & Amb. "	3 75	....	3 25	3 25	3 75	3 50
Lehigh Coal Exchange "	3 75	....	3 25	3 25	3 75	3 50
Honey Brook Lehigh	2 75	....	3 25	3 25	3 75	3 25
Beaver Meadow at South Amboy	3 75	....	3 25	3 25	3 75	3 25
Mount Pleasant at Hoboken	3 50	...	3 15	3 15	3 50	3 30
Cross Creek at Elizabethport	3 75	....	3 25	3 25	3 75	3 25
Schuylkill Coals at South Amboy.						
Schuylkill white ash	2 75	2 75	2 75	2 90	3 60	3 25
Schuylkill red ash	...	....	....	....	....	....
Lorberry	....	....	....	....	....	....
Lykens Valley	....	....	..	....	....	....
North Franklin red ash	....	....	....	....	....	....

‡ Boats towed by the D. & H. C. Co. at its expense to and from New York harbor.

Per ton.

Freight from Hoboken and Weehawken to New York.35@40c.
" " Elizabethport & Port Johnston to N. Y. 35@40c.
" " South Amboy to New York.....35@40c.

Freight by the boats of the companies from Hoboken, Port Johnston, Weehawken, South Amboy and Perth Amboy to New York City and vicinity 50c.

Pittston coal at New York delivered by Penn. Coal Co.'s boats 40c. per ton additional.

Lackawanna coal delivered to carts in New York or Brooklyn, 50 cents per ton additional.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 70	$6 00
" " at S. Amboy	5 50	6 00
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt.	4 25	5 65
Despard, West Va.	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburgh Orrel, Md. " "	4 50	6 00
Cannelton Cannel, W. Va.	....	10 00
" Splint, " at Richmond.	6 00	7 00
" Gas Coal at Richmond.	4 15	5 65
Peytona Cannel W. Va at Richmond	....	10 00

Manufacturing and Steam Coals.

Cumberland at Georgetown and Alexandria, Va.	3 50@3 75	5 20
Cumberland, at Baltimore	3 65@3 80	5 00
Clearfield f.o.b. Canton, Baltimore	3 40@....	5 45

Pennsylvania Semi-Bituminous Coals.

At the mines, per 2,000 lb., 90c. f.o.b. at Greenwich, Phila., for Eastern and foreign shipments, per 2240 lb. $3 25@3 35 for Sound ports, 3 50@3 65, f.o.b., at South Amboy, N. J., per 2,240 lb., $4 10@4 60. Discharged, in New York, per 2,240 lb., $5 00 @5 20.

Foreign Gas Coals.

	Sterling.	Am. currency.
Newcastle, at Newcastle-on-Tyne	9/6@11/	6 50@ 7 00
Liverpool House Orrel, at Liverpool	26/	13 00
Ince Hall Cannel "	42/	18 00
" Gas Cannel "	28/	13@14
Scotch Gas Cannel, at Glasgow, nominal,	25/	7 50
	Gold.	
Block House, at Cow Bay, N. S.	2 00	4 75
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 50	4 25
Lingan, at Lingan Bay	1 75	....
Sydney, International and Reserve mines, at Sydney	2 00	5 50
Pictou, Albion & Vale mines, at Pictou.	2 25	5 75

Retail Prices in New York.

Anthracite.

Per 2000 lb.	Grate and Egg.	Stove. Chestnut.
Pittston coal, in yard	$3 90	$4 20 $3 90
Lackawanna coal, in yard	3 90	4 20 3 90
Wilkes-Barre, delivered	5 00	5 30 4 60
Lehigh & Locust Mountain, del'd	5 50	5 50 5 00
Schuylkill Red Ash, del'd	5 25	5 50 4 75

The Cost of delivery for Pittston and Lackawanna coal ranges from 40 cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb				$18 00
Liverpool House Cannel	"	"	"	18 00
American	"	"	"	11 00
Cannelton Block, or splint,	"	"	"	10 00
American Crrel	"	"	"	11@14
Red Bank Cannel	"	"	"	10 00
Cumberland	"	"	"	7 00

Boston, Mass. Jan. 27, 1877.

COAL—Anthracite is flat. The market is amply supplied for all requirements, and the result of Wednesday's auction sales, with a decline of 15@25c. per ton on Scranton coal, is very disquieting to holders. The talk about shipping overland, which was indulged in when everything was frozen, has now ceased, communication with New York by water having been reopened. Probably not much will be done in this direction till the completion to the Poughkeepsie bridge. We reduce quotations about 25 cents per ton. Soft coals are scarce and on some grades higher. This is because of the impossibility of getting supplies by water from Baltimore. The small stock left of Cumberland is retailing on the wharf as high as $8@9 per ton. Clearfield is 75c. higher at wholesale. This coal is largely increasing in sale.

We quote Boston wholesale price as follows:

Anthracite, broken	5 00@5 50	Cannel, English	14 00@15 00
do egg	5 00@5 50	Do. Buckeye	10 00
do stove	5 75@6 25	Lingan	4 75@5 00
Cumberland	....	Pictou	5 50
Clearfield	5 75	Penn	6 50
Westmoreland	6 00	Youghiogheny	5 50@6 25
Caledonia	4 75@5 00		

—*Commercial Bulletin.*

Buffalo, N. Y. Jan. 31, 1877.

Specially reported by Messrs. PALEN & BURNS, 246 Washington street.

The following are the prices of Wilkes-Barre and Pittston coals, per ton of 2,000 lb., for Buffalo local trade for the month of February.

ANTHRACITE.

On Car or Boat.	To Dealers. In Yard, screened.	To Consumers. Delivered at retail.
Grate	$4 55	$4 75 $5 80
Egg	4 65	4 85 5 90
Stove	5 15	5 35 6 40
Chestnut	5 15	5 35 6 40

BITUMINOUS.

	car lots.	Retail, delivered.
Brier Hill, lump	$4 10	$6 00
Brookfield, "	4 15	6 00
Screened nut, Brookfield	3 00	4 50
Nut and slack, "	2 75	3 50
Reynoldsvile, lump	3 50	4 50
Buck Eye (Ohio), lump	3 50	4 50
Cannel	5 25	7 00
Connellsville Coke	5 10	....

Chicago, Ill. Jan. 30, 1877.

Specially reported by Messrs. RENO & LITTLE.

Lackawanna Stove	$8 00	Erie and Brier Hill	$6 00
" Chestnut	8 00	Wilmington & Ill.	3 50@ 4 25
" Grate & Egg,	7 50	Blossburgh	7 00

Cleveland, O. Jan. 30, 1877.

Specially reported by Messrs. LAMBIE & BATES.

The following are the prices established by the Coal Exchange until further notice:

Per ton of 2000 lb. f. o. b. vessels.

WHOLESALE.

	1 to 10 tons.	10 tons upw'd.
Brier Hill lump	$4 25	$4 00
" " nut	3 75	3 50
Massillon and Mineral Ridge lump	4 00	3 75
" " " nut	3 75	3 50
Straitsville Lower Vein, Hocking & Shawnee, lump	3 60	3 35
" " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lackawa., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 25	7 00

Lehigh to be $1 25 per ton higher.

All sales to be strictly cash with order or C. O. D.

Milwaukee, Wis. Jan. 30, 1877.

Specially reported by Messrs. R. P. ELMORE & Co.

Retail price per ton of 2000 lb.

Lehigh Lump	$8 00	Briar Hill, select	$7 00
Lehigh Prepared	9 00	Blossburgh	7 00
Lackawanna (all sizes)	8 00	Cannel	6 00
Pittston	8 00	Pittsburgh	6 50
Scranton	8 00	Oak Hill	6 00
		Steam coal	4@5 00

New Orleans, La. Jan 29, 1876.

Specially Reported by Messrs. C. A. MILTENBERGER & Co.

Pittsburg coal, wholesale, by boat-load, per bbl	50c.
" steamboats, per bbl	60c.
" to manufacturers, per bbl	65c.
" to families	75c.
" shipments, per hhd	$6 50
Anthracite, wholesale, per ton	7@8 00
" retail, "	11 00
Virginia Cannel, retail, per bbl	1 25
Scotch " "	....
Mt. Carbon, wholesale, per bbl	....
" " retail, "	....
St. Bernard wholesale, per bbl	—c.
" steamboat	55c.
" retail "	70c.

Pittston, Pa. Jan. 30, 1877.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional.

Philadelphia, Pa. Feb. 1, 1877.

From our Special Correspondent.

The trade is excessively dull here, unusually so for the season of the year, and after such severe weather. The ice continues to disappear gradually, and some vessels are loading for Boston, the rates ranging from $2.75 to $3.00, according to size.

The programme of the Reading, if there is to be any announced to encourage season contracts, is not known. There is some talk of the company offering coal delivered. This will be taking an additional risk, and with a prospect of freights ruling much higher than they did last year. A good many vessels were lost last fall, very few new ones built; the low prices for coal will increase the tonnage and cause a better demand for them, and the ice trade this summer must be very trifling compared to last. It is certain that at the rates ruling last season for coal freights many vessels will be tied up.

San Francisco, Cal.

From the *Commercial Herald*, Jan. 25, 1877.

Owing to light imports and smaller shipments of Australian that for many months past, the price of Wallsend has been advanced to $9; recent cargo sales of spot parcels Steam, $8 50@8 75; one cargo Wallsend, $9, 30 days.

Richmond, Va. Jan. 30, 1877.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2240 lb., f.o.b.

Kanawha Cannel	$9 00	New River Bituminous,	$4 40
Coalburgh Splint	5 70	Clover Hill Coal	3 50
Lewiston "	5 70	James River Bitum	3 30
Kanawha Gas coal	4 90	" " Carbonite,	5 00

Rates of Transportation on Anthracite Coal to Tide Ports.

PHILADELPHIA AND READING RAILROAD CO.
General Office, 227 South Fourth Street.
PHILADELPHIA, Dec. 18, 1876.

From and after this date, and until further notice, shipments of anthracite coal can be made through by rail to South Amboy, via Richmond Junction, at the following rates, per ton of 2,240 pounds, in company's car:

From Schuylkill Haven	$1 52
" Tamaqua	1 07
" Pine Grove	1 72
" Port Richmond	65

An additional charge of twenty-five cents per ton will be made on chestnut and pea coal, unless the shipper signs the usual release.

The release now in force will apply to this trade.

(By order of the Board of Managers),
DAVID BROWN, Secretary.

Lehigh and Wyoming Coals.

per ton of 2240 lb

	From Penn Haven.	From Mauch Chunk.	From Hazleton**	From Upper Lehigh.	From Ashley and Sugar Notch.
To ‡ Newark, N. J. (117 miles), via Central Railroad of New Jersey	1 62	1 48	2 04	1 95	2 18
‡ Mauch Chunk, Pa., via Central Railroad of N. J.	14	...	58	49	72
‡ Phillipsburg, N. J., (46 miles)	60	46	1 00	91	1 14
Elizabethp't, (114 m) Pt. Johns., Hoboken & South Amboy, N. J., shipping and wharfage 35c. add.	1 26	1 12	1 68	1 59	1 82
High Bridge, N. J.	1 95	1 75	2 43	2 34	2 52
Elizabeth, Cranford, Westfield & Elizabethport, for consumption,	1 89	1 75	2 31	2 22	2 45
Jersey City, N. J., (121 miles) and New York, via L. V. RR	1 59	1 47	2 01	1 92	2 15

From *Mauch Chunk* to *New York* (121 miles), (towing limits) and Jersey City† via Lehigh Valley RR. $1 47

From *Mauch Chunk* to *Philadelphia* (93 m.) via L. V. and L. and S. RR. and North Penn. RR 1 25

For way points between *Mauch Chunk* and *Phillipsburg*, on the New Jersey Railroads 1 co

From *Phillipsburg, N. J.* to *Hoboken* (84 m.) for shipment via Delaware, Lackawanna and Western RR., Morris and Essex Division 65

From *Phillipsburg, N. J.*, to *Newark* (75 m.) via Delaware, Lackawanna and Western RR. 1 01

**Rates on line coal from Hazleton are 10c. per ton above these figures.

‡ The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 15 per ton.

† Transportation on Coal destined for re-shipment from this point from boat to boat is 20c. less, if discharged upon the wharf 10c. less than the above rate.

The distances in the above table are computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 101 miles, and from *Mauch Chunk* it amounts to 106 miles.

Geneva, Ithaca and Sayre Railroad.—The rates of transportation on coal from Coxton, Pa., per ton of 2,240 lb., from and after the first of November, will be as follows:

To East Waverly, N. Y.	$1 75
" Ithaca, and for C. Lake RR. (local)	1 64
" " for C. Lake RR, and via Erie Canal (shipment)	1 57
" To Van Etten, for U. I and E. RR.	1 61
"Geneva (local) for S. P and S. and L. O. S. Railroads, and for N. Y. C. and H. R. RR., except Auburn and Cayuga	2 06
To Geneva, for Buffalo and Towanda	1 87
" " " Rochester and Charlotte	2 01
" " " Auburn and Cayuga	2 50
Total rate to Buffalo	3 11
" " " Rochester	2 78

REGULATIONS.

A charge of fifteen cents per ton will be collected of

each consignee on all coal not unloaded within twenty-four hours after its arrival, and an additional charge of ten cents per ton for every twenty-four thereafter; Sundays and legal holidays excepted.

No allowance will be made for coal lost from cars on account of broken doors or other defects existing when the cars are loaded.

Seventeen cents per ton will be charged, at Ithaca Docks, for shipping Coal direct from cars to vessels, and 12 cents per ton additional from stock, making a total charge on what is shipped from stock of 29 cents per ton.

All freights will be collected weekly, by drafts on shippers, from Coxton to destination.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Feb. 2, 1877.

American Pig.—We are reported sales of 6,000 tons of the Thomas Iron Company's Nos. 1 and 2 foundry iron in large lots at $20 and $19 per ton respectively. We are also reported sales of 5,000 tons of forge for delivery from Hoboken at $18 per ton, and 5,000 tons on private terms, also 500 tons of No. 1 foundry iron on private terms. With most of the business taken up by a few companies, the others doing comparatively little, the market again bears the appearance of quietness.

Scotch Pig.—Sales and arrivals continue to be small with quotations as follows: Coltness, $28@$28.50: Glengarnock, $27; and Eglinton $25.75.

Rails.—We note a sale of 2,500 tons of steel rails for Eastern shipment. There are further negotiations in progress. We quote iron rails at mills at $33@$38; and steel at $48@$52.

Old Rails.—We learn of no business and quote nominally at $20.

Scrap is dull and nominal at $26@$27.

Baltimore, Md. Jan. 31, 1877.

Specially reported by Messrs. R. C. HOFFMAN & Co.

We note an increased demand for good grades of pig iron during the past week—the stocks of which are becoming very much reduced. Quote prices as follows:

Baltimore Charcoal	$20@32	Mottled and White	16@17 00
Virginia Charcoal	28@32	Charcoal C. B. Blooms	60@62 50
Anthracite No. 1	22@23	" " Belletts	65@67 00
" No. 2	20@22	Refined Blooms	50@55 00
Anthracite No. 3	$19@20 00		

Boston, Mass. Jan. 27, 1877.

PIG is extremely quiet in our local market, and prices delivered here are a trifle easier, on account of a slight decline in freights from the shipping points, which in turn is due to the partial raising of the ice blockade. We quote $24@$24 50 for No. 1, $23@23 50 for No. 2, and $22 50@23 50 for gray forge. Scotch pig continues in light demand, with small receipts both here and at New York.

BAR is very quiet, quoting $47@48 for refined, and $38@39 for common. The recent activity in rails leaves the market in a very firm condition. A Southern demand for iron rails is expected as soon as confidence is fully established. The Texas-Pacific scheme is expected to impart much activity to a few favored mills. There is considerable demand for steel rails from narrow-gauge railways, and the Vermont Central among other lines is expected to shortly relay its road with steel.—*Commercial Bulletin.*

Buffalo, N. Y. Jan. 31, 1877.

Specially reported by Messrs. PALEN & BURNS, 246 Washington Street.

Market inactive, demand light, consumers buying only in car lots for immediate use. Spearman Bessemer metal, and Cherry Valley American Scotch, with Buffalo Union Iron Co.'s iron, are favorite irons among foundrymen here.

Prices per Gross ton at Buffalo.

ANTHRACITE.

No. 1 Foundry	$23 50.—4 mos.
B 1 "	22 00.—4 "
No. 2 "	21 50.—4 "
Gray Forge	21 00.—4 "

LAKE SUPERIOR CHARCOAL IRONS.

No. 1	$26 75.—4 mos.
No. 2	25 75.—4 "
No 3	25 25.—4 "
No. 4	25 25.—4 "
No. 5	25 75.—4 "
No. 6	26 25.—4 "

AMERICAN SCOTCH—CHERRY VALLEY.

No. 1	$25 50.—4 mos.
B 1	24 00.—4 "
No. 2	23 00.—4 "

Chattanooga, Tenn. Jan. 29, 1877.

Specially reported by J. F. JAMES, pig iron broker, etc., 233 Market Street.

There is a marked improvement in the condition of this market since my last report. Though present sales are limited for immediate consumption, inquiries for all grades of mill and foundry are so frequent as to cause a better feeling to exist.

At present prices remain unchanged.

Tenn. Ala. and Ga. Charcoal,	No. 1 foundry	$20@	21
" " " "	No. 2 foundry	18@	19
" " " "	gray forge	16@	17
" and Georgia coke,	No. 1 foundry	18@	19
" " "	No. 2 foundry	17@	18
" " "	gray forge	15@	16
White and Mottled		14@	15
Tennessee and Georgia cold-blast car wheel		21@	25
" "	gray forge	16@	18
Old Rails	cash	19@	20
Cast Scrap	"	10	
Wrought Scrap, No. 1	"	18@	—
" " " 2	"	12@	—

Cincinnati, Ohio. Jan. 30, 1877.

Specially reported by Messrs. TRABER & AUBERT, commission merchants for the sale of pig iron, blooms, ore, etc.

The demand for foundry irons is fair, and prices are firm at quotations:

CHARCOAL.

Hanging Rock, No. 1 Foundry	$24 00@25 00	—4 mos	
" No 2, "	23 00@	—4 mos	
" Mill "	22 00@	—4 mos	
" Soft Silver Gray	21 00@22 00	—4 mos	
Tennessee, No. 1, Foundry	24 00@	—4 mos	
Tennessee, No. 2, "	23 00@	—4 mos	
" Mill "	21 00@22 00	—4 mos	
Missouri, No. 1, Foundry	@	—4 mos	

STONE COAL.

Ohio, No. 1, Foundry	22 50@	—4 mos	
" No. 2, "	21 50@22 00	—4 mos	
" Soft Silver Grey	21 00@21 50	—4 mos	
Ohio Mill	20 00@21 00	—4 mos	
Missouri, No. 1 Foundry	25 00@	—4 mos	
" No. 2, "	24 00@	—4 mos	
" Mill	22 00@23 00	—4 mos	

CAR-WHEEL.

Hanging Rock, C. B	40 00@45 00	—4 mos	
Tennessee "	25 00@32 00	—4 mos	
Missouri "	30 00@33 00	—4 mos	
Alabama "	25 00@32 00	—4 mos	

BLOOMS.

Charcoal	55 00@	65 00	—cash

SCRAP IRON.

Cast	50c.@	85	—cash
Wrought	1 00@1	40	—cash

Cleveland, Ohio. Jan. 30, 1877.

Specially reported by Messrs. C. E. BINGHAM & Co.

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, Lake Superior Charcoal	26 00@
No. 2, " "	25 00@
No. 1, Anthracite	24 00@
No 2, "	23 00@
No. 1, Bituminous	24 00@
No. 2, "	22 00@
American Scotch, No. 1, Cherry Valley	24 00@
" " B—1, " "	23 00@
" " No. 2, " "	22 00@
No. 1, Massillon	24 50@
B—1, "	23 00@
No. 2, "	21 00@

CAR WHEEL AND MALLEABLE IRON.

No. 3 Lake Superior Charcoal	26 50@
No. 4 " " "	27 00@
Nos. 5 and 6 "	27 00@

BESSEMER IRON.

Nos. 1 and 2 Lake Superior Charcoal	26 50@

FORGE IRON.

No. 1, Gray	21 00@
White and Mottled	18 00@

Louisville, Ky. Jan. 30, 1877.

Specially reported by Messrs. GEORGE H. HULL & Co.

There has been considerable more inquiry for iron during the last week, and although the sales have not been large, we consider the indications favorable, and look for a healthy market in the near future.

The usual time, four months, allowed on quotations below.

HOT BLAST—CHARCOAL.

No. 1 Foundry, from Hanging Rock Ores	$24 00@25 00
No. 2 " " "	22 00@23 00
No. 1, Mill, from " "	20 00@21 00
No. 1, Foundry, from Alabama, Georgia and Tennessee ores	21 00@22 00
No. 2, Foundry, from Ala., Geor'a and Tenn. ores	20 00@21 00
No. 1, Mill, from " " " " "	20 00@ —

HOT BLAST—STONE COAL AND COKE.

No. 1, Foundry, from Hanging Rock Ores	22 00@23 00
No. 2, " " " " "	20 00@21 00
No. 1, Mill, " " " " "	19 00@20 00
No. 1, Foundry, from Ala. Ga. and Tenn. Ores.	21 00@22 00
No. 2, " " " " "	20 00@21 00
No. 1, Mill, " " " " "	20 00@ —
No. 1 Foundry, from Missouri Ores	— @ —
No. 2 " " " "	— @ —
No. 1 Mill, from Missouri Ores	23 00@24 00

COLD BLAST—CHARCOAL.

Car Wheel from Hanging Rock Ores	35 00@40 00
" " Tennessee "	26 00@28 00
" " Alabama and Georgia Ores	25 00@35 00
" " Kentucky Ores	25 00@40 00

Milwaukee, Wis. Jan. 30, 1877.

Specially reported by Messrs. R. P. ELMORE & Co.

Lake Superior No. 1 Charcoal	$26 00
" " " 2 "	25 00
Lake Superior No. 1 Anthracite	25 00
" " " 2 "	24 00

Pittsburg, Pa, Jan. 30, 1877.

Specially reported by A. H. CHILDS.

There is but little, if any, change in the condition of the metal market since last report. While no advance seems possible just at present, still the best brands are held firmly at full rates, and only metals of inferior quality are offered at any material concessions. Quotations are:

No. 1 Foundry	23 00@24—4 mos
" 2 "	22 00@23 "
Gray Forge	20 00@22 "
White and Mottled	18 00@19 "
Warm blast Charcoal	23 00@29 "
Cold blast Charcoal Western	40 00@45 "

Philadelphia, Pa.

(Weekly report of the Philadelphia Iron Market, furnished by Messrs. JUSTICE, COX, Jr., & Co., Iron Merchants, 333 Walnut Street, Philadelphia. Week ending Feb. 1, 1877.)

PIG IRON.—The demand is improving, all feeling prices are about as low as they will be this year. Some large sales are again reported this week for Eastern account on private terms, but thought to shade the quoted prices but slightly. The feeling seems prevalent that on the opening of navigation we will have a brisk trade if not higher prices. We report sales of 500 tons Chickies No. 1; 100 tons St. Charles No. 1; and 100 tons Montgomery No. 2, and about 5,000 tons scattering lots of No. 1 and 2 and forge. We quote No. 1 $20.50 to $21; No. 2, $18.50 to $19.50; forge, $17.50 to $20 as to brand.

MANUFACTURED IRON.—This week there is more doing in bars, but prices are a little weak. No large sales, but a demand for lots to fill orders and replace stocks. Tank, skelp and plate iron are dull. We quote bars 2c. to 2 1-5c. per lb.; tank, 2 7-8c. to 7c. as to quality; skelp, 2¼c. to 2¼c. per lb.

MUCK BARS $27 to $39.

NEW RAILS.—Steel are selling as for some months in a small way, and are about crowding out iron rails, which are selling in an exceedingly small way. We quote steel $50 to $52 and iron $36 to $40.

OLD RAILS.—The demand continues in a small way, buyers expecting on the opening of navigation to buy at their own price. We report sales of 300 tons at $22 and quote $21 to $22.

SCRAP.—Wrought scrap is in demand, but at low prices. We quote $22 to $26 for wrought, and $14 to $19 for cast.

Richmond, Va. Jan. 29, 1877.

Specially reported by ASA SNYDER, Esq.

Price of charcoal iron is unchanged. About 150 tons have been sold since last report. The inquiry is quite spirited and indicates an early sale of all held here in stock. Brokers are stiffening in their expectations.

Virginia Cold Blast Charcoal Pig Iron					$27 to	$33
" Warm " " " "					24 to	28
" " " Coke " "	1 X				23 to	24
" " " " "	2 X				21 to	22
" " " " "	3				20 to	21
" Anthracite	1 X				— to	—
" "	2 X				— to	—
" "	3				— to	—

San Francisco, Cal.

From the *Commercial Herald*, Jan. 25, 1877.

Last week we gave some figures regarding the Lead product of this coast, and this we now reproduce. The total production of Pig Lead of the Pacific coast, so far as it passes through San Francisco, was 10,443 tons for 1876. Of this amount there was shipped to New York 8,098 tons; consumed here, 2,035 tons; stock on hand, 400 tons. The above includes what was produced by the Shelby Company, the Richmond Company, and the Sacramento and Oakland smelting works The price of pig Lead East is now about $6 10 currency, and the price here to the trade is 5¼@6c; Bar Lead, 7c; Drop Shot, $2 37½ per 25-lb bags; Buck Shot, $2 62½. From present indications it would seem that the Lead production this present year (1877) will be considerably increased, as the mines in Inyo County are turning out better than ever before. Arizona also is opening up some new mines, and the Eureka Consolidated Company has recently struck a large ore body. The market here for Pig Iron, Tin Plates, and Sydney Tin is altogether quiet and prices nominal.

St. Louis, Mo. Jan. 30, 1877.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

We note no change in our market since last report. The majority of our foundries continue idle, and trade very dull. We look for a change in a week or two.

We quote same as last.

CHARCOAL.

Missouri No. 1 Found'y.	$23@25		
" " 2 "	22@23		
" Gray Mill	22@23		
H. Rock No. 1 Found'y.	25@26		
" " " 2 "	23½@24		
" " Gray Mill	23@24		
Tenn. No. 1 Foundry	23½@24		
" " 2 "	22½@23		
" Gray Mill	22½@23		

COKE.

Alice H. R. Ex No. 1 F'y.	26 00		
" 1 "	25 00		
B, " 1 "	24 50		
" 2 "	23 50		
Forge	23 50		
Chat., Tenn. No. 1 Fd'y.	25 00		
" " " 2 "	23 50		
" " Forge	22 50		
" " White Mtl'd	21 00		

STONE COAL.

Missouri No. 1 Fd'ry.	25@24		
" " 2 "	23@23		
" Gray Mill	22@23		
" White & Mt'd	21@22		

COLD BLAST CHARCOAL FOR CAR WHEELS.

All Numbers.

Hanging Rock	35@46
Tennessee	30@33
Kentucky	30@33
Missouri	28@30
Georgia	28@30
Alabama	28@30
Assorted Bar Iron	$2 25, rates.
No. 1 Wrought Scrap	95c. cwt.
Heavy cast	" 70 "
Light	" 40 "

Montreal, Canada. Jan. 23, 1877.

We quote: Pig Iron.—Eglinton and Clyde, $19.50@20.00; American $21.00@22.00; Summerlee and Calder $20.75@21.25; Langloan & Gartsherrie $22.00@22.50; Hematite $26.00@27.00. Bar, per 100 lbs., Scotch and Staffordshire $2.00@2.05; best do., $2.20@2.30, Swedes and Norway $4.75@$5.00; Lowmoor and Bowling, $6@6.50.—*Monetary Times.*

METALS.

NEW YORK, FRIDAY EVENING, Feb. 2, 1877.

Upon the whole there has been much more business done during this week, than during the previous one. Several of the articles are in a position that make it possible to advance prices materially upon the first indications of a better demand.

Gold Coin.—During the week under review the price of gold has ranged from 104⅞ to 105⅛ and closed at 105¼.

Bullion.—The Indian Council on Wednesday, when silver was weak at 57d. (a decline for the week of 1¾d. per oz.), having beenbid, on the basis of ½d. per rupee, equal to 1¼d. per oz. decided to award but one-half of their bills. The consequence was an advance to 57⅛d. to-day's closing quotation in the London market which is firm. The price in this city is 123¾@124 and in San

Francisco, 4 per cent. discount. Fine gold bars are quoted at par to ¼ per cent. premium.

Copper.—During the week under review about 6,000,000 lb. of ingot copper were sold for export, deliveries to be made previous to July, at, it is said, 19c. In addition to this large sale, about 1,000,000 lb. have been sold at 20c.@20½c., the market closing at 20¼c.@21c. The statistical position of this article appears to be better in this country than it has been for several years. Upon the first of January it was estimated that we had a stock of 7,000,000 lb. After making very liberal allowances for receipts overland from all quarters, and counting upon an average consumption, it was shown that by the opening of navigation our stock would be, at the outside, not greater than 1,000,000 lb. If the figures were nearly correct, and they were generally accepted, the shipments that must be made on this sale will entirely exhaust our stock, and must of necessity considerably advance the price, in fact, should carry it up to a figure only within the cost of importing, from other countries, copper of an equal quality.

Tin.—This article is very quiet. Straits, in London, is quoted at £73 10/. In this market we quote, in gold, per lb., as follows: Straits, 17@17½c.; L. & F., 16¾c.; Refined, 17c.; Banca, 19¼@19½c.

Tin Plates.—There is a better business in these, and much larger inquiries. Prices are firmer, although unchanged. We quote as follows, in gold, per box: charcoal tins, $6 62½@$6.87½, and ternes, $6.12½@$6.37½; coke tins, $6, and ternes, $5.50.

Lead.—The stock of lead in this market is very small and anticipated arrivals are not great. During the week 50 tons were sold at 6·20c., and 50 tons at 6·22½c. The market closes with 6·20c. bid, and 6·25c. asked.

Spelter and Zinc.—Domestic spelter is quiet but firm at 6½@6¼c., currency. Sheet zinc is quoted at 7¾@8¼c., currency.

Antimony is quiet at 13@13¼c., gold.

Quicksilver.—The London quotation has advanced and is now £8 5/; in San Francisco the price has declined and is now 47½ cents, while here it is unchanged at 52 cents.

The San Francisco *Commercial Herald*, of Jan. 25th 1877 says of Quicksilver:—Last week we gave an exhaustive review of this article, showing the Pacific slope production in 1876 to be 75,074 flasks of 76½ lbs each. The present price is 50c.

FINANCIAL.

New York Stocks.

NEW YORK, FRIDAY EVENING, Feb. 2, 1877.

The coal stocks naturally continue to attract the closest attention of the bulls and bears. The bears have much the best of the fight at present, and, so far as we can see, are likely to keep possession of the field for months to come Our current coal trade reports and reviews of the coal trade for the past year afford the safest ground on which to predict the future course of these securities, and they give little hope that the downward course can be stopped for some time to come or at figures much above zero for some of the stocks—indeed the course of these bears a great resemblance to that of Erie just before the appointment of a receiver, and their value may be estimated by that of the control of the elections of its officers. The New Jersey Central has attracted the greatest attention; its efforts to negotiate the new "blanket mortgage" have not been entirely successful, but it was enabled to "raise" the money for the interest on its first mortgage bonds falling due yesterday. The stock suddenly rose some 5 to 6 per cent, but after a single day is falling back to its lower level. We understand some of the employees on the line of this road have not been paid for two or three months, and the miners at Wilkes-Barre are also calling for the pay they should have received two months ago. On the whole the outlook in this direction does not improve, though unquestionably the general business of the country is looking up, and we look for a decided improvement with the settlement of the political question and the opening of the spring trade. The decline of gold is very encouraging as indicating an early return to the solid basis of specie payments, and this will take one disturbing element out of the business of the country. The course of the several stocks will be found in our table of quotations.

New Jersey Central Railroad.—This stock has fluctuated widely during the week, the extreme quotations being 34@21¼, the final price showing a recovery of 4⅝ per cent. The transactions aggregate 150,000 shares.

Delaware, Lackawanna and Western Railroad Company. Nearly 190,000 shares of this stock have changed hands during the week at from 67½ to 72⅝ per cent., closing at 69.

Delaware and Hudson Canal Company.—About 14,000 shares of this stock were sold, the extreme fluctuations showing a difference of 10 per cent., and the final price of 60½, a decline of 5¼ per cent. for the week.

Mariposa Land and Mining Company.—This stock has shown considerable activity during the week.

Bonds are generally lower, the sales amounting to $130,000.

COUPONS AND INTEREST are due on the bonds of the following companies during the present month:

Central Railroad of New Jersey.—Coupons of first mortgage bonds of 1890.

Cleveland and Mahoning Railroad Company.—Coupons of first mortgage bonds.

Consolidation Coal Company.—Coupons of second mortgage bonds (assumed) of Cumberland Coal and Iron Company.

Cumberland Coal and Iron Company.—Coupons of second mortgage bonds paid by the Consolidation Coal Company.

Joliet Iron and Steel Company.—Coupons.

Milwaukee Iron Company.—Coupons are due.

Morris and Essex Railroad Company.—Coupons of second mortgage and construction bonds of 1889, paid by the Delaware, Lackawanna and Western Railroad Company.

Oswego and Syracuse Railroad Company.—Interest due 20th inst. on stock, will be paid by the Delaware, Lackawanna and Western Railroad Company.

Oswego and Rome Railroad.—Coupons paid by the Delaware, Lackawanna and Western Railroad Company.

Pennsylvania Coal Company.—Interest on first mortgage 7 per cent. registered bonds.

St. Louis and Iron Mountain Railroad Company.—Coupons of first mortgage bonds.

Steubenville and Indiana Railroad Company.—Coupons of first mortgage bonds paid by United New Jersey Railroad and Canal Company.

United New Jersey Railroad and Canal Company.—Coupons.

Vulcan Iron Works Company of Chattanooga, Tenn.—Coupons are due.

Wheeling Iron and Nail Works.—Coupons become due.

Delaware, Lackawanna and Western Railroad Company.—The annual meeting of this company will be held on the 20th inst.

The Chicago, Wilmington and Vermillion Coal Company announces a dividend of 3 per cent., payable in Boston.

Andover Iron Company.—The dividend period of this company will occur during the present month.

The Gilberton Coal Company announces a dividend of 2½ per cent., payable on demand.

Quicksilver Mining Company.—This company will hold its annual meeting on the 28th inst.

Consolidation Coal Company.—The annual meeting of this company will be held on the 21st inst.

Quotations and Sales of Stocks and Bonds.

For the week ending Feb. 2, 1877.

STOCKS.

	Highest	Lowest	Closing	Shares sold.
Pennsylvania Coal Co	—	—	221	—
Consolidation Coal Co	34¼	34	30	700
Spring Mt. Coal Co	—	—	60	—
American Coal Co	—	—	*54	—
Maryland Coal Co	—	—	9	—
Del., Lack., and West. RR. Co.	72⅝	67½	69	189,736
New Jersey Central RR. Co.	34	21¼	25⅝	149,730
Delaware and Hudson Canal Co.	69½	59¼	60½	13,476
Quicksilver Mining Co. pref'd	23	22	15¾	200
" " " Common	16	14½	21¾	150
Mariposa Land & Min. Co. pref'd	6	5⅛	5¼	2,750
St. Louis & Iron Mountain RR.	—	—	11	—
Total Shares sold				356,742
Sales for the week previous				111,969
Increase				244,773

*Nominal. † Asked.

BONDS.

	Inter'st	Sales.	Price.
Del., Lack. & West. 2d M	M. & S.	....	.... @109
" " " 7's Con'ble	J. & D.	3,000	.... @103
Cent'l RR. of N.J., 1st M., New	F. & A.	16,000	105 @109
" " " 1st Cons.	.....	13,000	75½@ 79
" " " Convert'le	M. & N.	44,000	72¾@ 74¾
Lehigh & W.-B'e, Con. Guar'd.	.....	14,000	52½@ 59
Am. Dock & Imp. Mt. Bonds	J. & J.	....	.... @ 72½
Del. & Hud. Can., 1st M., 1891	.....	16,000	100 @102⅛
" " " 1884	.. ....	7,000	100½@101
" " " 1877	.....	8,000	.... @102
" " " Coup. 7's, 1894	.....	5,000	.... @ 97
" " " Reg'd 7's, 1894	.....	.....	.... @ ....
St. L. & Iron Mountain, 1st M	F. & A.	5,000	.... @101½
" " " 2d M	M. & N	.....	.... @ 70
Chesapeake & Ohio 6's, 1st M.	.....	.....	.... @ 26⅜
" " " Ex. Coupon	.....	.....	.... @ 20
Mariposa Gold Loan con. 7s	.....	.....	.... @100⅝
Total sales		$131,000	

Closing quotations, in the absence of sales, represent the latest prices bid.

Philadelphia Stocks.

PHILADELPHIA, Thursday Evening, Feb. 1, 1877.

A very large business has been done during the past week in the coal shares dealt in on this market, the total transactions amounting to nearly 178,000 shares. The quotations are all down, the market closing firm at nearly the lowest prices for the week.

Pennsylvania Railroad.—This stock is lower, having sold down to 46, with sales of 76,000 shares for the week. This decline is attributed to the rumors intimating that the quarterly dividend would be at a less rate than 8 per cent. but the company has declared its usual quarterly dividend of two per cent., and in connection with this fact it takes occasion to say that it is from earnings, and leaves a handsome surplus to the credit of profit and loss. The business of the company is said to be unusually large, and at prices, while not oppressive to transporters, fairly remunerative to the road. The closing price of 46¼ ex-dividend is equal to the final prices reported a week ago.

Reading Railroad.—About 83,000 shares of this stock were sold during the week at from 15¼ to 12⅞, the final price showing a recovery equal to 1¾ per cent. from the lower quotation.

Lehigh Valley Railroad.—This stock closes at 46⅞, equal to a decline of over 5 per cent. for the week. Sales amount to about 1,200 shares.

Lehigh Coal and Navigation Company.—This stock has been very active, and is the steadiest stock on the list, the extreme prices ranging within 4 per cent. The final price of 28¾ shows an advance of 2¾ per cent. from the lowest prices of the week.

We see it stated that Mr. E. W. Clark, the president of the Lehigh Coal and Navigation Company has consented to accept the chairmanship of the Board of Directors of the Lehigh and Wilkes-Barre Coal Company. We have been aware for some time that some arrangement of this sort was contemplated. Hence the reported fact now is probably true, and, we believe, will prove advantageous to the interests of all concerned in the two companies. Mr. Clark is said to have resigned from the banking house of E. W. Clarke & Co., in order to give his whole attention to the interests of the companies which he represents.

Coupons and Interest are due on the bonds of the following companies during the present month:

Bellefonte and Snow Shoe Railroad Company.—Interest on the first mortgage bonds.

Belvidere, Delaware, Railroad Company.—Third mortgage bonds of 1857, guaranteed by Camden and Amboy Railroad, coupons paid by Pennsylvania Railroad Company.

Camden and Amboy Railroad Company.—Coupons paid by Pennsylvania Railroad Company.

Camden and Burlington Railroad Company.—Bonds; interest paid by Pennsylvania Railroad Company.

Catawissa Railroad Company.—Coupons on first chattel and new mortgages.

Delaware and Raritan Canal Company.—Coupons.

Huntingdon and Broad Top Mountain Railroad Company.—Coupons and scrip, interest on second mortgage bonds.

Lehigh Coal and Navigation Company.—Interest on registered loan of 1897, also on Greenwood Tract bonds of 1892.

Morris Canal.—Interest on preferred dividend scrip.

New Jersey Railroad and Transportation Company.—Interest on loan of 1878, paid by Pennsylvania Railroad Company.

Pennsylvania Railroad Company.—Interest on United Companies' loan of 1888; New Jersey Railroad and Transportation Company, loan of 1878; Joint Companies', of 1883; Camden and Burlington Company Railroad bonds; Perth Amboy and Woodbridge Railroad bonds; and Belvidere and Delaware Railroad, third mortgage bonds.

Pittsburgh, Cincinnati and St. Louis Railroad Company.—Coupons of con. 7 per cent. bonds, paid by Pennsylvania Railroad Company.

Pittsburgh and Connellsville Railroad Company.—Bonds of Turtle Creek Division.

United N. J. Railroad Company.—Interest on loan of 1888, paid by Pennsylvania Railroad Company.

Schuylkill Navigation Company.—This company has declared a divident of 66c. on its preferred stock and 33c. on its common stock, payable on the 15th inst.

The Shenango and Allegheny Railroad Company has declared a dividend of ten per cent. upon its stock from the surplus earnings of the past year.

S. C. Smith Iron Company.—The annual meeting of this company will be held at Sharpsville, Pa., on the 15th inst.

Pennsylvania Salt Manufacturing Company.—12 shares of this stock were sold at auction during the week at $64 per share.

Wilmington and Reading Railroad Company (Reading Railroad branch mortgage).—$143,000 of the 7 per cent. bonds of this company due in 1904, whole number of coupons on were sold at auction during the week at 56 per cent.

United New Jersey Railroad and Canal Company.—13 shares of the stock of this company were sold at auction during the week at $140.12 per share.

The Philadelphia and Erie Railroad Company make the following exhibit of business for the month of December, 1876:

Gross earnings	$298,292 47
Gross expenses	150,563 64
Net earnings	$147,728 83
Net earnings year 1876	$1,164,533 25
Net earnings year 1875	1,137,413 56
Increase	27,119,69

Quotations and Sales of Stocks and Bonds.

For the week ending Feb. 1, 1877.

STOCKS.

	Highest	Lowest	Closing	Shr s
Lehigh Valley RR. Co	49½	46¾	46⅞	1,203
Pennsylvania RR.	48½	46	46¼	75,875
Reading RR.	15⅝	12⅞	13¾	83,391
Lehigh Coal and Nav. Co	29½	27½	28¾	17,034
Penn. Canal	—	—	—	—
Buck Mountain Coal Co.	—	—	*25	—
Fulton Coal Co.	—	—	—	—
Locust Mountain Coal Co	—	—	—	—
Westmoreland Coal Co	—	—	*85	—
St. Nicholas Coal Co.	—	—	—	—
Cambria Iron Co	—	—	14½	253
Crane Iron Co.	—	—	*25	—
Emaus Iron Co	—	—	—	—
Pennsylvania Salt Manufact. Co.	—	—	66	—
Total shares sold				177,766
Sales for the week previous				115,631
Increase				62,135

* These quotations are nominal.

MINING STOCKS.

AMERICAN MINING AND STOCK EXCHANGE.

Name of Company.	Location.	Feet on Vein.	Capital Stock.	*a* No. of Shares.	Total Assessments Levied.	Date and Amount of Last Assessment per share.	Total Dividends paid.	Date and Amount of Last Dividend per share.	Closing Quotations *g* American Currency. Sat.	Mon.	Tues.	Wed.	Thurs.	Fri.	Shares sold during the week.
Alpha Cons. G. S.	Nevada,	300	$ 3,000,000	30,000	$180,000	Aug. 12, '75, $1.	....	.....	$24 12½	$22 25	$21 87½	$23 25	$20 75	$21 25	2,500
Belcher, G. S.	Nevada,	1,040	10,400,000	104,000	660,400	April 14, '71, $1.	$15,397,200	April 10, '76, $1.	8 75	9 62½	9 25	10 00	9 25	8 75	2,500
Bertha Gold Co.	Virgi'a.	645 acs.	300,000	30,000	**	.....	....	.....	8 50	8 25	8 00	8 00	8 50	8 12½	4,400
Best and Belcher, G. S.	Nevada,	545	10,080 000	100,800	136,192	July 13, '74, 50c.	....	.....	....	35 00	36 62½	37 00	38 12½	....	1,100
Bullion, G. S.	Nevada	943½	19,000,000	100,000	2,052,000	Sept. 22, '76, $2.50.	....	.....	....	19 00	19 75	19 00	17 50	17 12½	1,400
Caledonia, G. S.	Nevada,	2,188	10,000,000	100,000	1,210,000	Aug. 28, '76, $1.	....	.....	....	....	....	....	11 75	11 00	200
California, G. S.	Nevada,	600	54,000,000	540,000	....	.....	9,720,000	Jan. 15, '77, $2.	....	44 50	48 75	52 00	46 37½	49 50	1,740
Centennial, G.	Califor.	66 acres	1,000,000	100,000*b*	....	.....	....	.....	....	....	....	....	....	....	....
Chollar Potosi, G. S.	Nevada,	1,400	2,800,000	28,000	1,282,000	June 26, '76, $5.	3,080,000	Feb. 10, '72, $1.	73 00	65 75	69 00	76 00	73 00	72 50	8,0
Cleveland, G.	Colo.	3,715	250,000	25,000*b*	**	.....	....	.....	9 75	9 87½	9 75	10 00	10 00	9 52½	3,900
Cons. Hercules & Roe, S	Colo.	16,500	1,000,000	100,000	**	.....	120,000	.....	....	....	....	....	....	....	.....
Cons. Imperial, G. S.	Nevada,	468	50,000,000	500,000	125 000	July 25, '76, 25c.	....	.....	2 50	....	2 62½	2 25	....	2 50	3,300
Cons. N. Slope & E. C. T.	Colo.	15,000	500,000	10,000	**	.....	....	.....	15 87½	15 75	15 75	16 00	16 00	16 00	1,500
Cons. Virginia, G. S.	Nevada,	710	54,000,000	540,000	411,200	June 11, '73, $3.	25,920,000	Dec. 11, '76, $2.	55 00	46 25	51 00	....	50 25	49 00	1,570
Confidence, G. S.	Nevada,	130	2,496,000	24,960	243,840	March 18, '73, $1.	78,000	May 1, '65, $8.33½	11 25	....	11 00	11 50	....	9 50	1,400
Crown Point, G. S.	Nevada,	600	10,020,000	100,000	1,273,370	Jan. 10, '77, $1.	11,588,000	Jan. 12, '75, $2.	8 75	8 25	8 75	10 25	8 87½	8 62½	1,900
Douglas Mining Co.	Colo.	21,000	1,000,000	10,000	**	.....	....	.....	....	....	....	....	....	....	.....
Eureka Cons. G. S. L.	Nevada,	..	5,000,000	50,000	100,000	May 26, '76, $1.	1,000,000	Aug. 5, '75, $1.	....	20 75	21 87½	22 25	....	....	400
Exchequer, G. S.	Nevada,	400	10,000,000	100,000	280,000	Sept. 23, '76, $1.	....	.....	8 50	7 87½	7 87½	8 00	6 50	7 50	2,300
Gould and Curry, G. S.	Nevada,	621	10,800,000	108,000	2,018,000	Dec. 11, '76, $1.	3,934,800	Oct. 10, '70, $10.	13 00	12 50	12 87½	13 25	12 62½	12 00	2,500
Grant, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	5 62½	5 50	5 37½	5 00	4 75	4 62½	4,300
Granville Gold Co.	N. Car.	9,000	1,000,000	100,000	**	.....	....	.....	5 37½	5 00	4 50	4 00	3 75	3 62½	5,100
Hale & Norcross, G. S.	Nevada,	400	11 200,000	112,000	2,242,000	Oct. 10, '76, $1.	1,598,000	April 10, '71, $5.	6 50	....	6 50	6 12½	5 87½	6 00	3,150
Hukill, S.	Colo.	3,283	1,000,000	10,000	**	.....	20,000	Nov. 1, '76, $1	....	....	....	....	....	....	.....
Indian Queen, S.	Nevada,	1,000	3 000,000	60,000	....	.....	60,000	.....	....	....	....	....	....	....	.....
Julia Cons. G. S.	Nevada,	3,000	11,000,000	110,000	220,000	Jan. 4, '77, $1.	....	.....	....	....	4 87½	5 12½	....	....	800
Justice, G. S.	Nevada,	2,100	10,500,000	105,000	1,502,500	Sept. 14, '76, $5.	....	.....	....	14 87½	15 75	15 00	14 75	14 75	1,850
Kentuck, G. S.	Nevada,	95	3,000,000	30,000	270,000	Dec. 3, '74, $1.	1,252,020	March 8, '70, $5.	....	....	....	....	9 50	9 12½	500
Kossuth, G. S.	Nevada,	2,700	5,400,000	108,000*c*	405,000	Aug. 15, '76, 50c.	....	.....	1 50	1 12½	1 37½	1 00	1 12½	1 00	3,800
Leopard, G. S.	Nevada,	1,500	5,00 ,000	50,000	50,000	March 31, '76, $1.	162,500	Dec. 15, '76, 50c.	4 50	4 75	4 75	4 50	4 00	4 37½	2,600
Lucerne Mining Co.	Colo.	4,200	5,000,000	500,000	**	.....	....	.....	1 75	1 75	1 87½	1 75	1 87½	1 87½	4,600
Mer. and Min. Tun. Co.	Colo.	37,000	500,000	50,000	**	.....	....	.....	....	....	....	....	....	....	.....
Merrimac, S.	Mass.	1,500	500,000	50,000*b*	**	.....	65,000	Jan. 10, '77, $1.	5 37½	5 37½	5 50	5 50	5 62½	5 62½	7,900
Mexican, G. S.	Nevada,	600	10,080,000	100,800	100,800	Sept. 5, '76, 50c.	....	.....	20 00	13 00	19 00	19 50	19 75	18 25	3,200
Morning Star	Nevada,	1,600	8,000,000	80,000	....	.....	....	.....	....	....	....	....	....	....	.....
Northern Belle, S.	Nevada,	1,600	5,000,000	50,000	....	.....	1,000,000	Jan. 15, '77, $1.	29 00	28 75	....	30 00	31 00	29 75	850
Ophir, G. S.	Nevada,	675	10,080,000	100,800	2,034,400	May 14, '75, $2.	1,394,400	March 9, '04, $4.	31 00	27 75	27 75	28 50	33 12½	27 25	2,800
Original Comstock, G. S.	Nevada,	....	10,000,000	10,000	....	.....	....	.....	....	....	....	....	....	....	.....
Overman, G. S.	Nevada,	1,200	3,840,000	38,400*b*	2,222,280	Oct. 21, '76, $3.	....	.....	108 75	99 75	104 00	108 00	106 50	105 00	1150
Pleasant View	Colo.	1,200	200,000	20,000	**	.....	....	.....	....	....	....	....	....	....	.....
Raymond and Ely, G. S.	Nevada,	5,000	3,000,000	30,000	540,000	Dec. 5, '76, $1.	3,075,000	Sept. 10, '73, $3.	10 00	7 00	....	7 25	7 75	6 00	1275
St. Joseph Lead Co.	Missou.	2500 acs.	1,000,000	100,000	....	.....	210,000	.....	....	....	....	....	....	....	.....
Santiago, G. S.	Nevada,	2,000	11,200,000	112,000	....	.....	....	.....	....	....	....	....	....	....	.....
Savage, G. S.	Nevada,	800	11,200,000	112,000	2,858,000	Nov. 25, '76, $1.	4,460,000	June 11, '69, $3.	10 30	9 25	8 87½	9 00	7 75	9 00	2,200
Seg. Belcher, G. S.	Nevada,	160	640,000	6,400	244,800	April 11, '76, $5.	....	.....	72 00	69 00	69 12½	71 00	68 62½	....	1,170
Sierra Nevada, G. S.	Nevada,	3,650	10,000,000	100,000	1,500,000	Oct. 24, '76, $1.	102,500	Jan. 16, '71, $1.	....	9 00	8 75	9 00	8 50	8 87½	3,600
Silver City, G. S.	Nevada,	3,900	6,310,000	63,100	15,775	Nov. 16, '76, 25c.	....	.....	....	....	....	....	....	....	.
Silver Hill, G. S.	Nevada,	5,400	10,800,000	108,000	810,000	Sept. 18, '76, $1.	....	.....	8 00	7 50	7 37½	7 50	7 12½	....	1,900
South Comstock, G. S.	Nevada,	1,500	10,000,000	100,000	44,000	May 3, '76, 10c.	....	.....	....	....	....	....	....	....	.....
South, California, G. S	Nevada,	1,500	5,000,000	50,000	....	.....	....	.....	....	....	....	....	....	....	.....
Southern Star, G. S.	Nevada,	1,500	6,000,000	600,000	....	.....	....	.....	....	....	....	....	....	....	.....
Trenton, G. S.	Nevada,	..	10,200,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Union Cons. G. S.	Nevada,	850	10,000,000	100,000	260,000	March 3, '76, $1.	....	.....	10 12½	9 62½	10 12½	10 00	10 62½	10 50	3,500
West Belcher, G. S.	Nevada,	1,000	10,000,000	100,000	....	.....	....	.....	....	....	....	....	....	....	.....
Yellow Jacket, G. S.	Nevada,	1,200	12,000,000	120,000	2,718,000	Oct. 28, '76, $1.	2,184,000	Aug. 10, '71, $2.50.	17 50	15 75	16 62½	18 00	15 87½	16 50	3,275
Young America, S.	Nevada,	1,000	3,000,000	30,000	6,000	Oct. 23, '76, 20c.	....	.....	....	....	....	....	....	....	.....
			Assessments levied to date, $28,015,557			Div'ds	to date, $86,421,400						Total sales		93,660

COMSTOCK STOCK MARKET.

									Fri.	Sat.	Mon.	Tues.	Wed.	Thurs.	
Allouez, C.	Mich.	..	$1,000,000	20 000	$940,0.0	May 9, '76. $5.	....	.....	$5 25	5 62½	5 25	5 00	5 00	5 25	.....
Calumet and Hecla, C.	Mich.	2¼ mile	2,000,000	80,000*d i*	1,200,000	.....	$11,050,000	Nov. 15, '76, $5.	173 00	173 00	174 00	175 00	174 63½	175 00	.....
Central, C.	Mich.	..	500,000	20,000	100,000	June, '62, 65c.	1,020,000	Feb. 17, '76, $5.	30 00	30 25	30 25	30 50	30 75	31 00	.....
Copper Falls, C.	Mich.	..	1,000,000	20,000*d*	535,000	May 10, '76,	100,000	Nov., '71, $1.	3 12½	3 25	3 25	3 50	3 50	3 25	.....
Dana, C	Mich.	..	500,000	20,000*d*	68,000	Jan., '73, 50c.	....	.....	10	10	10	10	10	10	.....
Dawson, S.	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	12½	12½	12½	12½	12½	12½	.....
Duncan, S.	Canada.	..	1,200,000	60,000*f*	75,000	July, '76, 41½.	....	.....	6 12½	6 12½	6 00	5 87½	5 50	5 62½	.....
Franklin, C	Mich.	..	500,000	20,000*d*	360,000	June, '68, $5.	585,000	Nov., '71, $1.	14 00	14 12½	14 25	14 50	14 62½	14 75	.....
Humboldt, C.	Mich.	..	500,000	20,000*d*	100,000	Sept. 28, '76, 15c.	....	.....	17½	18	18	18	20	20	.....
International, S.	Canada.	..	1,200,000	60,000*f*	....	.....	....	.....	87½	87½	68¾	68¾	62½	62½	.....
Madison, C.	Mich.	..	50 ,000	20,000*d*	123,000	Sept. 11, '74, 10c.	....	.....	27	28	26	25	25	25	.....
Mesnard, C.	Mich.	..	500,000	20,000*d*	160,000	April 12, '65, 50c.	....	.....	50	50	52	55	55	60	.....
Minesota, C.	Mich.	..	1,000,000	20,000*c*	436,000	June 10, '69, $1.	1,820,000	Mch. 15, '76, 50c.	1 25	1 31¼	1 62½	1 62½	1 62½	1 62½	.....
National, C.	Mich.	..	500,000	20,000*c*	195,000	Oct., '75, $1.	360,000	Oct., '73, $1.	1 37½	1 37½	1 31¼	1 43¾	1 43¾	1 50	.....
Osceola, C	Mich.	..	1,000,000	40,000*d*	880,000	May 1, '76, $2.	....	.....	25 00	26 00	27 00	28 00	29 00	30 00	.....
Petherick, C.	Mich.	..	500,000	20,000*d*	165,533	March 22, '76, 50c.	....	.....	37	38	38	40	40	40	.....
Pewabic, C.	Mich.	..	500,000	20,000*d*	185,000	June, '68, $3.	460,000	July, '73, $1.	3 25	3 25	3 25	3 37½	3 37½	3 50	.....
Phœnix, C.	Mich.	..	1,000,000	20,000*d*	817,500	Sept., '70, $3.	20,000	Jan 20, '76, $1.	....	....	....	....	....	....	.....
Quincy, C.	Mich.	..	*h* 200,000	20,000*b*	....	.....	2,050,000	Oct. 28, '76, $3.	48 00	*44 00	43 50	43 75	44 00	44 00	.....
Ridge, C.	Mich.	..	500,000	20,000*d*	200,000	.....	90,000	Feb. 8, '75, $1.	4 50	4 50	4 62½	4 62½	4 62½	4 62½	.....
Rockland, C.	Mich.	..	500,000	20,000*d*	495,000	Jan., '74, $1.	....	.....	25	25	25	25	25	25	.....
Star, C.	Mich.	..	500,000	20,000*d*	265,000	March 30, '76, 50c.	....	.....	30	30	30	30	30	30	.....
Superior, C.	Mich.	..	500,000	20,000*d*	340,000	March, '74, 25c.	....	.....	12½	12½	12½	12½	12½	12½	.....
			Assessments levied to date, $7,640,033			Div'ds paid to date, $17,555,000							Total sales		—— shares

G. Gold. S. Silver. L. Lead. C Copper. *a* The par value of shares is $100, unless otherwise designated. *b* Par value $10. *c* Par value $50. *d* Par value $25 each. *e* Par value $15. Par value $20. *g* Closing quotations represent the latest prices bid. Prices asked will have a * affixed. *h* Full paid. *i* On the four old companies. * Ex-dividend.

BONDS.

	Sales.	Price
Atlantic and B. T. RR. 1st mortgage, 7s	$ ——	—— @108
" " " 2d " "	——	—— @105
" " " 3d " cons	——	—— @ 30
Lehigh Valley RR. Con. mtg. 6s	2,000	—— @ 98½
" " " 7s, 1910	——	—— @115
" " " 6s Reg	2,000	—— @109
" " " 6s coup	——	—— @119¼
Pennsylvania RR., 1st mtge. 6s	37,000	105¼ @ 105¾
" " gen. " cou. 1910	——	—— @106
" " gen. " 6s, reg	3,000	107 @109
" " Cons. M. 6s reg	4,000	—— @100
Phil. & Reading RR. Con. M. 7s Reg	9,700	88 @ 92
" " " 6s, 49-80	——	—— @103
" " " 7s 1893	5,000	—— @104
" " new convertible 7s	92,000	40 @ 50
" " 6s 1880	——	—— @103½
" " Cons M. 7s coup	14,000	89 @ 92
" " debenture 6s	——	—— @ 60
" " 6s gold coupon	——	—— @ 95
Phil. & Reading C. & I. Co. Deb. 7s	——	—— @ 55
" " Helfenstein tract	1,000	—— @ 55
Lehigh Coal & Nav. Co., 6s '84	500	—— @105
" " " RR 6s, '97	——	—— @104½
" " " con. 7s	——	—— @ 80
" " " 6s gold loan	6,000	96¼ @ 98¾
" " " Conv. gold loan	——	—— @108
Penn. Canal, 6s	——	—— @ 70
Penn. and N. Y. Canal, 7s	13,000	—— @111½
Ches. and Del. Canal, 6s	——	—— @ 85
Susquehanna Canal, 6s	——	—— @ 68
Delaware Division Canal, 6s	——	—— @——
Susquehanna Coal Co. 6s	——	—— @ 78
Buck. Mount Coal Co. 6s	——	—— @——
Penn. Gas Coal Co. 6s	——	—— @——
Honeybrook Coal Co. 7s	——	—— @——
Total amount of sales	**$189 400**	

Closing quotations, in the absence of sales, represent the latest prices bid.

Copper Stocks.

Specially reported by Messrs. WILSON W. FAY & Co., Bankers and Brokers, Room 7 Traveller Building, 31 State Street, Boston.

BOSTON, THURSDAY EVENING, Feb. 1, 1877.

The market on mining stocks, although dull as previously reported, is much stronger than it was last week. There is a growing demand for small coppers, and some of the more favorite ones have advanced materially. Calumet is two points higher and strong. Copper Falls has sold during the week at 3¼. Duncan, for some unknown reason is depressed and goes hard at 5⅝, almost $1 per share lower than last week. Humboldt is inquired for at .16, some 15,000 shares were sold at auction on the 30th for non-payment of assessment of .15 per share, and bought by one party at .16, he taking the lot. It is now .20 bid, and looks as if it was going to be pushed to higher figures. National is in demand at 1½. Osceola has taken a jump of $5 per share from 25 to 30, and the same bid. Petherick is in demand at 45. We look with confidence for a rise this spring, and think some of the shrewd ones are buying now to that end.

Central Copper Mining Company.—This company has declared a dividend of $7 per share, payable on the 6th inst.

The New Bedford Copper Company of New Bedford, Mass., will pay on demand a dividend of 3 per cent.

Gold and Silver Stocks.

AMERICAN MINING AND STOCK EXCHANGE.

NEW YORK, FRIDAY EVENING, Feb. 2, 1877.

The quotations of mining stocks are fairly maintained. With reference to the recent excitement in the San Francisco Mining Board, the *Commercial Herald* of the 24th ult. says:

"It has become quite apparent that the raid recently inaugurated upon bonanza stocks is the work of a combination or 'ring,' backed up, according to report, by a fund of $7,000,000, and it is beyond question that what is known as the 'borrowing process,' or the duplicate use of stocks, has been carried to greater extremes than ever, thereby placing stocks actually owned by parties other than brokers, yet confided to brokers for negotiation, in the most jeopardous and precarious position. In July, California sold at $56 per share, and since then has paid dividends to the amount of $12 per share, while its sellinig-price on the 13th of January was $45 per share. Consolidated Virginia sold in July at $45 per share, and on the 13th of January at $35 per share, having in the

meantime disbursed dividends of $10 per share. Furthermore, we state right here that seventy-two per cent. of the gross yield of those two mines have been paid to the stockholders under the management of Messrs. Flood. O'Brien. Mackey and Fair, while the very best managed among the other mines of the Comstock lode has never paid more than fifty per cent. of the gross yields to the shareholders. Had not the bonanza firm recently sustained the market prices would have reached a far lower depth than they did, and this we assert positively.

A recent despatch from Virginia City states that a plot to destroy the hoisting works of the two bonanza mines has just been discovered. The force of watchmen around the works of the bonanza mines have been increased, and all have been supplied with shot-guns. The belief here is that these attempts have been made by scoundrels in the employ of bear operators in San Francisco.

Caralel Gold Mining Company.—This company will hold its annual meeting on the 6th inst.

INCORPORATIONS.

We note the recent organization of the following mining companies in addition to the announcements in our issue of December 30, 1876 :

Name of Company.	Location.	Cap. Stock.
Allison-Pœnix Mining Company.....	California.	$100,000
Summit Mining Company.....	"	2,500,000
Planet Blue Gravel Mining Company...	"	2,300,000
Aurum and Argentine Mining Company	"	1,000,000
*Pope Valley Quicksilver Mining Co...	"	20,000,000
Modoc Chief Mining Company.....	"	10 000,000
Eagle Copper and Silver Mining Co.....	"	1.000,000
Clear Creek Gold and Silver Mining Co.	"	8,000,000
Giant Gold and Silver Mining Company	"	5.000,000
Onward Gold and Silver Mining Co.....	"	10.000,000
Erskine Creek Mining Company.....	"	10,000,000
Pima Gold and Silver Mining Co.....	Arizona.	10,000,000
Vermont Mining Co	"	1,000,000
Northern King Mining Company.....	"	10,000,000
Silver Dureen Mining Company.....	"	10,000,000
Black Sand Gold Mining Company.....	Oregon.	10,000,000
Braxton Iron Company	West Va.	6,000

*This company is a consolidation of the Phœnix, Washington and Red Hill Quicksilver Mining Companies.

Gas Stocks.

NEW YORK, FRIDAY EVENING Feb. 2, 1877.

The quotations of gas stocks generally range higher. The market is very quiet.

The Metropolitan Gas Company announces a dividend of 5 per cent. on its stock, and 3½ per cent. on the scrip, payable on the 6th inst.

The Brooklyn Gas Company announces a 5 per cent. dividend, payable on the 10th inst.

The Harlem Gas Company announces a dividend of 5 per cent., payable on the 5th inst.

The Lawrence, Mass., Gas Company announces a dividend of 5 per cent. This is an increase of 1 per cent. as compared with the amount paid by this company in August last.

The Salem, Mass., Gas Company announces a dividend of $3 per share.

The Malden and Melrose, Mass., Gas Company announces a dividend of 2 per cent This a reduction from 2½ per cent. as paid last August.

The Cambridge, Mass., Gas Company announces a dividend of 5 per cent.

The Charlestown, Mass., Gas Company announces a dividend of 5 per cent., payable on demand.

The Dorchester, Mass., Gas Company announces a dividend of 2¼ per cent.

The Jamaica Plains, Mass., Gas Company has declared a dividend of 4 per cent.

The Newtown and Watertown, Mass., Gas Company has declared a dividend of 5 per cent.

The South Boston Gas Company has declared a dividend of 3¾ per cent.

Northern Liberties Gas Company.—We note a recent auction sale of 10 shares of the stock of this Company par $25, at $43 per share.

People's Gas-Light Company of Albany, N. Y. The coupons of this company fall due during the present month.

Hamilton, Ontario, Gas Complaints.—The question of cheaper gas is becoming a prominent one among our Canadian cousins. A Hamilton, Ont., correspondent of the *Toronto Mail* of the 30th ult. says : "Here, as well as in Toronto, Guelph and elsewhere, there is considerable complaint touching the price of gas, which, it is alleged, is kept up at a figure out of all proportion to its cost and value."

A Comparison of Cost of Lighting Street Lamps with Oil and Gas.—At a meeting of the Common Council of Kingston, N. Y., on the 26th ult., the Committee on Lamps submitted the following report : "There are within the city 303 gas and oil lamps, of which 142 are gas lamps, at an expense of $1.83⅓ per month for each lamp, or $22 per year. There are within the city 161 oil lamps at an expense of $1.25 per month for each lamp, or $15 a year, paid to different lamp-lighters."

Central City, Colorado, Gas Works.—The Common Council of this city have adopted an ordinance authorizing the erection of gas works. The works are to be completed by the first day of September. The gas to be supplied is to be of a standard power of sixteen candles. The price fixed is $3.75 per 1,000 feet, and the city is to pay $45 per year for each street lamp, the lamps to be furnished with a five-feet burner.

The Trenton, N. J., Gas Company has reduced the price of gas to one dollar and eighty cents per 1,000 feet.

Grass Valley, California, Gas Company.—This company has reduced the price of gas from $8 to $7 per 1,000 feet.

The Chicago Gas Supply for 1876.—The annual report of the Gas Inspector, sent to the Council by the Mayor, showed that there are in the city 10,553 street lamps, distributed along 308 miles of mains. 10,528 are in use, the services of twenty-five having been dispensed with. The test meters and burners are under constant supervision, and are tested quarterly. The average consumption per lamp during the year was 14,648.75 cubic feet in the North and South Divisions, and 15,459.50 cubic feet in the West Division. This is a decrease of between 4,000 and 5,000 cubic feet, as compared with the preceding year. The saving was effected by the adoption of new time-tables and smaller burners. The main saving was after August, when the changes took place By the old time-table the lights were lighted 3,500 hours, and by the new one 2,300 hours. It is estimated that the entire consumption of gas for the ensuing year will be 187,000 000 cubic feet, a saving of 114,000,000 feet as compared with 1875. To this would have to be added an expense of about $6 per lost for lighting, extinguishing, cleaning, etc. In the case of the North and South Divisions, where the price of gas has been reduced to $1.50 per 1,000 cubic feet, the expense will be about one-quarter of what it heretofore has been. During the year 9,123 lamps were reported not lighted in the West Division, and 5,952 in the North and South Divisions. About half of these were reported during the cold months. The consumption of gas in the La Salle street tunnel was 2,384.600 cubic feet, and in the Washington street tunnel 1,654.800 cubic feet. The quality of gas supplied by the Gas Light and Coke Company averaged 17 to 18 candles, except last month, when it was reduced, chiefly by condensation and deterioration caused by cold weather to 14.9 candles.

Abolishing the Philadelphia Gas Trust.—A proposition has been made with a fair prospect of its passing the Common Council, having for its object the charge of the present system of managing the gas works of Philadelphia. A committee agreed to report, with a favorable recommendation, an ordinance that appropriates from $1,000,000 to $500,000 for the purpose of enabling the city authorities to take direct charge of the property and works now under control of the gas trustees.

The approval of this ordinance will apparently lead to the organizaaton of a gas department, on a footing similar to the existing highway and water departments.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas Stocks, No. 30 Broad st., N. Y.

Companies in New York and Vicinity	Cap. Stk.	Par.	last Div.	When Paid.	Bid.	Askd.
			pr.c			
Mutual, N. Y.....	$5,000,000	$ 100	2½	Jan. '77	100	102½
" " Bonds	90,000	1,000	†3½	Feb. '77		109
NewYork, "	4,000,000		5	Nov. '76	133	135
Metropol. "	2,500,000	100	5	Sep. '76	142	147½
" " Certf.	1,000,000	....	3½	" "	101	103
" " Bonds	500,000	1,000	3½	Dec. "		102
Harlem "	1.850,000	50	4	Feb. '77	104	—
Manhattan"	4,000,000	50	10	Dec. "	233	236
Brooklyn, B'klyn..	2,000,000	25	5	Nov. '76	170	172
Nassau "	1,000,000	25	4	Jan. '76	80	—
" "Certf.	700,000	1,000	3½	Nov. '76	95	—
People's "	1,000,000	10	3½	Jan. '76	48	52½
" "Certf.	300,000	1,000	3½	July '76	84	90
" " Bds	325,000	....	3	Feb. '77	90	96
Metropol. "	1,000,000	10	3½	Nov. '76	76	80
Wmsburgh "	1,000,000	50	3	Oct. '76	130	—
" "Certf.	1,000,000	....	3½	July "	100	102½
Citizen's "	1,200,000	20	2½	Jan. '76	98	101
" "Certf.	320,000	1,000	3½	Oct. "	98	102
J. C. N.J.....	750,000	20	5	July,'75	160	—
Centl. Westch. N.Y.	466,000	50	4	July. "	90	—
Subur'n " "	390,000	50				90

† Gold.

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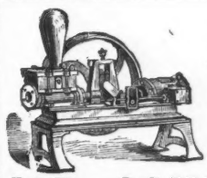

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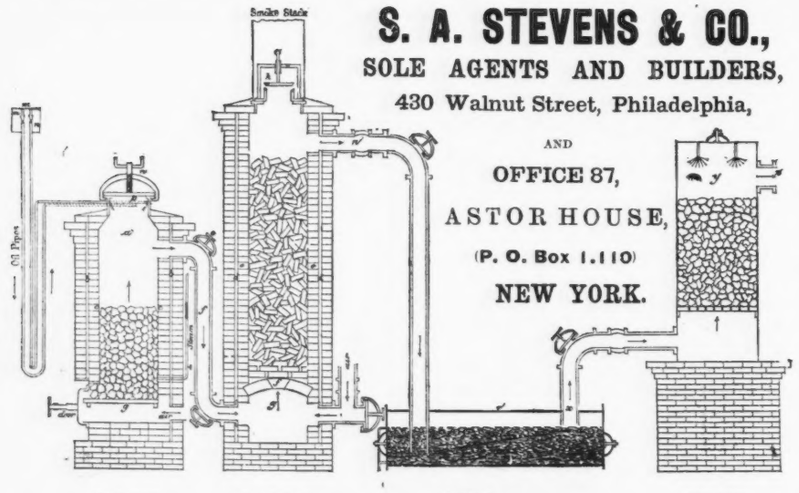

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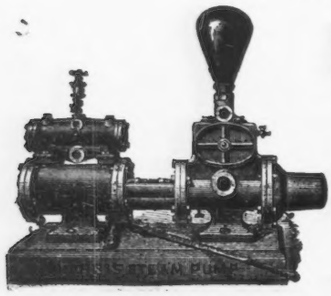

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